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Army and Navy Requirements Conference

Is Held By Technical Association of the Pulp and Paper Industry And Is Attended By More Than 3500—Various Other Paper Organizations Meet Making It In Fact A "Paper Week" For Chicago.

FROM OUR SPECIAL REPRESENTATIVE

CHICAGO, Ill., September 27, 1943—The requirements of the Army and the Navy with respect to its use of paper during the War, was the main consideration of the Army and Navy Requirements Conference of the Technical Association of the Pulp and Paper Industry when it met at the Palmer House, Chicago, Ill., on September 21-24, 1943. Although the meeting was sponsored by TAPPI, it was, in fact, "Paper Week" in Chicago for most of the leading paper manufacturing and converting organizations of the industry held meetings there. More than 3,500 attended the TAPPI meeting alone. No record of attendance at other meetings was reported.

Active Local Committee

In past years, the Fall Meetings of the Technical Association were sponsored by local sections or local organizations. This year there was an obvious need for a united front and an all out endeavor to focus attention on the paper and packaging problems of the Armed Forces. Chicago, the largest and most centrally located city of the industry was selected as the site of the meeting. In the absence of a local section, a group of capable and enthusiastic association members undertook the task of organizing this important event.

A. T. Montgomery of the J. O. Ross Engineering Corporation was appointed General Chairman and with the assistance of Miss Kathleen Carey as Secretary-Treasurer of the Conference and the following committee chairmen worked together with the National Secretary R. G. Macdonald to carry out the details of handling the meeting: Advisory—Walter C. Daley, Watab Paper Company; Finance—Peter J. Massey, H. P. Smith Paper Company; Arrangements—Walter M. Bain, Glidden Company; Program and Exhibits—Harry E. Weston, Fritz Publications Inc.; Entertainment—W. H. Monsson, Hooker Electrochemical Company; Registration—Wilder A. Chapman, Robert W. Hunt Company; Transportation—A. A. Coffin, Titanium Pigment Company, and Publicity—Arnold McAneny, Bradner, Smith and Company.

Meetings of Tuesday, September 21

The opening of the Armed Services Sessions was propitious. Band selections were played by the Great Lakes Naval Training Station Band under the leadership of Commander Eddie Peabody, Director. The presentation of the Colors was a fitting ceremony to mark the significance of this great conference, dedicated as it was to the wholehearted desire of the industry to contribute its special talents and resources toward the winning of the War through focused attention to the paper problems of the Forces.

At 10 A. M. R. A. Hayward, President of the Technical Association introduced the first speaker in a broadcast over Radio Station WGN—Rear Admiral Everett G. Morsell (SC) U.S.N. District Supply Office of the 9th Naval District, Great Lakes Naval Training Station, Great Lakes, Ill. He was followed by Brigadier General E. E. MacMorland of the Office of Chief of Ordnance, U.S.A. Rear Admiral Morsell talked on "Navy Supply Lines" and Brigadier General MacMorland on "Paper Sinews of War."

Admiral Morsell spoke as follows:—

Navy Supply Lines

Everyone who is concerned with the logistics of this war—the procurement and movement of supplies—is well aware that the progress our armed forces are making is due primarily to the fact that American industries have done what the Axis nations considered impossible. We have worked production miracles. In less than two years since the treacherous attack on Pearl Harbor forced war upon us, our industries have produced the equipment and supplies required for invincible military power on land and sea and in the air. As a direct result of our phenomenal production achievements, the cause of freedom now is advancing with swelling might on the long hard road to total victory.

Planned in War Councils

The production which has turned the tide in this war and makes possible our military successes was planned in the war council of industry, such as this conference sponsored by the Technical Association of the Pulp and Paper Industry. The importance of this meeting cannot be overemphasized. Hundreds of manufacturers of essential supplies for our armed forces have assembled here to study technical problems of military requirements so they may be better equipped to provide our fighting men with what they need when they need it. These studies may well contribute to the shortening of the war and the saving of many American lives.

It is no exaggeration to say that the duration of the war and the number of casualties we may suffer in winning it may in part be determined by the pulp and paper industry. The Army and Navy depends to a large extent on the manufacturers represented here today for the material and containers to properly package supplies, and packaging is a vital phase of logistics.

Our supplies, no matter how much we produce, are of no avail unless they are delivered READY FOR USE when and where they are needed. All kinds of supplies must be packed for shipment in a manner that will assure their arrival in undamaged condition. That, is a primary responsibility of your industry, and as we open this conference today we realize that its program is of great consequence in our war effort.

In this global war, with our theaters of operation extending from the Arctic to the Tropics we have no way of knowing when supplies are packed, which or how many of the seven seas they will have to traverse, or in what quarter of the globe they will be used or when. They must be ready for instant use whether they are unpacked in winter blizzards of the far north, under glaring sun of arid deserts or in the steaming humidity of equitorial jungles.

Does Not Know Cautions Terms

War transportation does not know the cautions "Fragile", "Handle With Care", "This Side Up", and "Use No Hooks." Transportation may include heavily loaded cargo ships, airplanes, submarines, trucks, jeeps, dog-sleds, rafts, camel or burro back, or native porter. Boxes may be shaken like dice in loading nets or hoisted with plate hooks from ships' holds to be tumbled into wave-tossed lighters miles from shore. They may be floated through pounding surf to open beaches where they may be piled ex-

Taken at the Luncheon of the Army and Navy Requirements Conference of the Technical

posed to the elements for days or weeks. Some may be dropped by parachute, through enemy fire, or tossed from speeding trucks in combat zones.

I had the opportunity some months ago to inspect our supply lines and advanced bases in the South and Southwest Pacific areas to see how our supplies are delivered. Our supplies are getting through to be employed to the best advantage against the enemy, but serious losses of supplies have been sustained from failure to observe necessary packaging, packing and preservation requirements—losses which in some cases have seriously affected operations. In blunt terms, that means that failure to "pack it right" on the production lines may mean the needless expenditure of American lives on the firing line.

Illustrating a Point

One of our supply officers at an advance base in the South Pacific area recounts a personal experience which well illustrates this point. He was riding on the tail board of a light truck through the jungles. Three other men were in the cab. That truck was in dire need of repairs. For one thing, its exhaust muffler had been knocked off. The truck would still run, but it made such a terrific noise that the men on it could not hear the approach of an enemy plane in time to duck for shelter. A light bomb hit the cab. Three men were killed and the supply officer was wrapped around a tree and critically injured. He regained consciousness a week later in the hospital to learn what had happened. Now, the muffler needed for that cab had been requisitioned but it did not arrive at its destination, possibly because the package containing it fell apart. Had it arrived on time, the lives of three of our boys could have been spared and long weeks of suffering for the survivor could have been prevented.

That's one of the imperative reasons why the Navy's container specialists are collaborating with the Container Divisions of the Army, the War Production Board, the Lend-Lease Program, and the Technical Experts of your industry to develop the types of containers that may save lives, by preventing loss in transit of needed supplies.

Through the cooperative efforts of government agencies and industry standardized specifications for containers that will serve the purpose for which they are designed have been developed. Those specifications are published in an illustrated manual titled "Army-Navy General Specifications for Packaging and Packing for Overseas Shipments."

An Indispensable Aid

This practical reference manual is an indispensable

Association of the Pulp and Paper Industry, Palmer House, Chicago, Wednesday, September 22, 1943

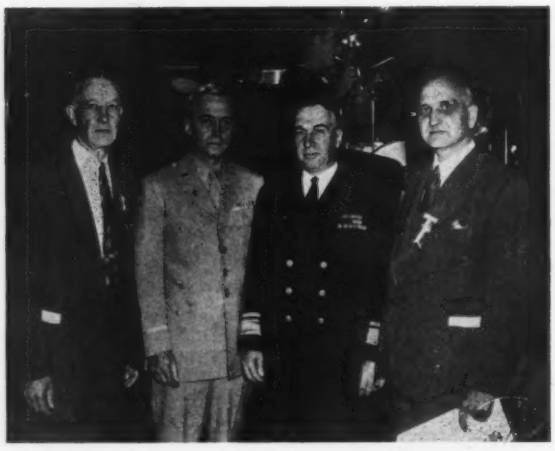
aid to every manufacturer now producing material and supplies for overseas shipment. Copies may be obtained free on request to the Bureau of Supplies and Accounts, Navy Department, Washington, D. C. This manual provides manufacturers and shippers with the latest information and best practices involved in packing right to reach the fight.

We have made great advance in protective packaging. Many of these developments are on exhibit here. But we cannot say that this problem is completely licked. Operational conditions constantly change. New types of equipment and varied supply requirements demand constant developments in packaging. But the progress we have made through cooperative efforts gives every assurance that continued cooperation between Government agencies and industry will result in a satisfactory solution for every packaging problem that arises in this war of supplies.

Commends Technical Association

On behalf of the Navy, I want to commend the Technical Association of the Pulp and Paper Industry for sponsoring this Conference, and express the Navy's appreciation for this fine attendance. I know that every man in this room is here because he wants to do not merely his bit, but his *best* to hasten our victory. Certainly, the proper packaging of supplies will enable us to utilize the full force of our production and military power to accelerate our march on Berlin and Tokio. If precious skill, labor and materials are wasted because supplies we produce fail to reach our fighting men due to faulty packaging, the war will be needlessly prolonged. That tragedy must not be permitted to happen.

At best, we are a long way from the unconditional surrender of our enemies. We face months—perhaps years—of bitter fighting. Greater sacrifices and greater efforts inevitably will be demanded of all of us. To think otherwise is dangerous wishful thinking. All of us who serve behind the fighting lines must permit nothing to interfere with the increasing flow of weapons, equipment, food and other supplies to our men on the battle fronts. The pulp and paper industry holds a strategic position to assure maintenance of our flow of supplies. The Navy knows it can count on you to make it possible for all producers of the supplies we require to "pack it right to reach the fight."



Left to Right: Vance P. Edwardes, Vice Pres. TAPPI; Brig. Gen. E. E. McMorland; Rear Admiral Everett G. Morsell; Ralph A. Hayward, Pres. TAPPI

Exhibit of Signal Corps, U. S. Army and Air Forces

Brigadier General E. E. MacMorland spoke as follows:—

Paper Sinews of War

We have found in the Army that this is not entirely "the age of steel." If we were to define these times in terms of our materials, I suppose we should call it the age of combined materials. Of steel, of aluminum, oil, wood, plastics—and not least among them, *paper*,—all combined in new ways. So it is that paper has become one of the sinews of war.

Paper Saves $25,000 Instrument

A few months ago in Casablanca I was watching some of our guns and instruments being unpacked. One of these pieces was a mechanism used to direct anti-aircraft gunfire which had evidently been dropped and the box damaged. These directors weigh a quarter of a ton apiece, but they are so precise and, in a sense, so delicate, that they have to be manufactured in air-conditioned rooms where the slightest flake of dust or hint of rust is kept from their watch-like interior. Their heavy metal parts are balanced nicely to move on precision gears, to calculate, faster than any human brain, the height, speed and direction of flight of enemy planes flying 400 miles an hour, and to direct the fire of our great guns to the precise spot where the flight of the plane crosses the path of the shell. By all rights that director in the damaged box should have been done for. We had the box opened then and there. Inside we found our mechanism undamaged.

How was this $25,000 instrument saved from destruction? It was very simple, really. The director had been cushioned in paper. After trying steel spiral springs and wood cantilever springs we hit on special built-up corrugated pads wrapped and sealed in heavy waterproof paper. These pads are cheap, easy to assemble, and they protect perfectly the instruments which it is so essential to deliver in serviceable condition to the troops overseas.

Paper Industry Has Delivered the Goods

We have found that the science of production alone is not enough and so have enlisted also the best efforts of the science of protection. The fruits of American industry must reach our fighters in usable condition. We have asked you of the paper industry

Tribute to TAPPI

BIRD MACHINE COMPANY * takes this occasion to express sincere admiration and respect for the loyal and effective way in which the members of TAPPI are meeting emergency needs and conditions. No one appreciates more keenly than we the character and significance of their contribution to our paper industry and our Country.

To TAPPI and each of its individual members we pledge constant, unflagging support and whatever assistance we can render, now and in the years to come.

BIRD MACHINE COMPANY
South Walpole, Massachusetts

*At present builders of equipment for the armed forces of the United States.

Former and future builders of ***Bird Screens, Bird Centrifiners, Bird Save-Alls, Vickery Doctors, Vickery Felt Conditioners*** and other paper-making equipment.

to develop waterproof, moisture-vapor proof and greaseproof papers, new types of containers, new wrappers. Your knowledge has in every instance given us what we need, and I want to tell you that we have used your product well.

The Ordnance Department is using great quantities of the acid-free, grease-proof wrapping papers successfully developed to protect metal surfaces from corrosion. Army Ordnance is using from 12 to 15 million square yards a month, enough to cover perhaps 25 thousand acres a year, and other Army agencies, and the Navy, are using additional amounts. All this war-use has necessitated rapid expansion of production of critical types of paper products. I understand, the paper industry produced something like 4,000 tons of waterproof paper in 1941; today, the annual production is more than 230,000 tons. A year ago you were making less than a million square yards a month of greaseproof wrapping; today Army Ordnance alone is using fifteen times that much a month. A year ago there was no paper suitable for our packings from which we remove all moisture to protect finished surfaces from corrosion; today paper is a most important component part of almost all the material the Army is using for this purpose. At the start of the war there was no fiberboard capable of withstanding the rigors of wartime export shipping; today the new V-boards and other special waterproof fiberboards are carrying a great part of the Army's ammunition, subsistence and other supplies.

Speedy Assistance from TAPPI

The Army has obtained from your organization, the Technical Association of the Pulp and Paper Industry, speedy assistance whenever these needs have arisen. Your association has established standards, gathered and disseminated information to help the entire paper industry in these new assignments, and developed tests to assure that our soldiers could depend on the protective wrappings we use. We depend on you to understand our problems and to help translate them for the industry.

Gentlemen, an axiom of war is that nothing at all is won until all is won. In our pursuits of peace we may approach our goals and count ourselves successful. Not so in war. I am sure some of the cunning brains around Hitler are counting on relaxation of our efforts just before victory. There must be no relaxation of effort nor of standards. And in the degree the Army requires your best production, we must insist that not so much as a square foot of your fighting paper slips through below standard.

Exhibit of Corps of Engineers, Transportation Corps, Ordnance Department, Medical Department and Quartermaster Corps.

Urgency for Assistance Continues

Despite continued good news, the war is not finished, and neither are our demands upon you. Today we need greaseproof wrappings using the least possible amounts of wax, synthetic resins, plastic coatings, glycerin and other critical materials urgently required for other war purposes. We need papers of higher waterproofness and resistance to moisture vapor and of greater strength for use with our dehydrated packs. We need better waterproof papers for lining our boxes. I am sure you realize that every urgency is a continuing urgency in war, and that you will provide these materials.

I want you to know that your work has been eminently worthwhile. The weapons which Army Ordnance sends the men are reaching them now in good-as-new condition, and I can think of nothing of which you might be more proud today than of the fact that your efforts have been an essential contribution to victory.

Exhibit of Bureau of Aeronautics, Bureau of Ordnance, Bureau of Medicine and Surgery

Exhibit of Bureau of Supplies and Accounts, U. S. Coast Guard, U. S. Marine Corps and Bureau of Ships

Will be ready to serve you

Right now our sleeves are rolled and we're putting every ounce of our energy into the war effort.

—and we'll keep them rolled to meet the exacting and speedy demands a world at peace will bring.

The same ingenuity and resourcefulness, speed and precision that we are putting into war production will be applied to get equipment where most urgently needed—YOUR PLANT.

IMPROVED PAPER MACHINERY CORP. · NASHUA, N. H.

MAKERS OF THE FOLLOWING MACHINES FOR THE PAPER INDUSTRY

ROTARY AND FLAT SCREEN KNOTTERS · CENTRIFUGAL SCREENS · FLAT SCREENS WITH DUNBAR DRIVE (METAL OR CYPRESS VATS) · VACUUM FILTERS, INCLUDING SAVE-ALLS, WASHERS, HIGH DENSITY THICKENERS, LIME SLUDGE FILTERS, BLACK LIQUOR WASHERS, FORMING CYLINDERS · MULTIPLE STAGE COUNTER-CURRENT PAPER STOCK WASHERS, DECKERS, WET MACHINES, INCLUDING HYDRAULIC WITH HIGH DENSITY VACUUM WET END THORNE BLEACHING EQUIPMENT · PNEUMATIC WATER FILTERS · THE IMPCO LINE OF "IMPROVED" EQUIPMENT IS ASSISTING IN THE ECONOMICAL PRODUCTION OF QUALITY PULP AND PAPERS

Navy Problems

There followed several addresses in a program arranged by Lt. (j.g.) W. S. Hassler (SC) U.S.N. of the Containers Section, Bureau of Supplies and Accounts. The first speakers were Lt. C. S. McNair and P. P. Kennedy of the Containers Section who talked on "The Navy's Packaging Problems." This talk, illustrated by moving pictures, was based on personal observations during a survey by the speakers in the South Pacific.

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Major Robert M. Melson of the Chicago Quartermaster Depot, Subsistence Research Laboratory discussed "What the Quartermaster Expects from Paper Products."

"An Analysis of the Application of Paper Products to Chemical Warfare Service Packaging" was the subject of a talk by Lt. T. E. Steinmetz, Technical Div., Chemical Warfare Service.

Capt. George Wallerschein, Packaging and Marking Branch, Port and Field Agencies Div., Office of the Chief of Transportation talked on "Marking Army Shipment."

T. T. Holbrook and A. L. Whiton, Packaging Staff, Field Service Div., of the Office of the Chief of Ordnance discussed "The Requirements of Protective Papers for Ordnance Overseas Packaging." This was a presentation of the problems that must be met in developing satisfactory noncritical water vaporproof barriers, greaseproof wrappers and bag liners.

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Fort Dearborn Party

Although entertainment features during the meeting was held to a minimum, it was realized that much value would result from informal assemblies. For this reason, a dinner and entertainment designated as the Fort Dearborn Party—Fort Dearborn being the original name of Chicago.

Meetings of Wednesday, September 22

Ordnance Packaging Session

J. D. Malcolmson of Robert Gair Company presided.

Members of the Technical Service Training Staff of the Forest Products Laboratory conducted a symposium on "Certain Aspects of the Problems of Packaging War Materials and Supplies for Export Shipment." The lectures were similar to those given at Madison, Wis., to the ordnance packaging contractors of the Army and the Navy.

George A. Garratt, Chief of the Division presented "Factors Affecting the Design and Construction of Shipping Containers." This address gave consideration to the hazards involved in handling, transportation, and storage of war material and supplies; character of stresses induced by the various hazards; the importance of laboratory tests in container design; size and weight restrictions imposed by structural limitations of containers and by handling requirements, significance of cubic displacement in connection with water-borne shipments; the nature of contents in relation to their need for protection against corrosion, breakage and other forms of hidden damage.

Herbert B. McKean, technologist at the Forest Products Laboratory talked on "The Corrosion Problem and How It May Be Met." In this talk he outlined the significance of corrosion prevention in packaging war material, causes of corrosion, importance of the proper cleaning of parts prior to preservative treatment, preservative processes, with emphasis on the application of rust-preventive compounds, requirements and application of greaseproof wrapping materials, and the role of waterproof papers in packaging.

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Coatings and Adhesives Round Table

To meet the current emergency problems brought about by Government restrictions in the use of certain adhesives, the Coating Committee under the chairmanship of Werner Kaufmann of Kupfer Bros.

HOW TO ADD COLOR TO YOUR REPUTATION!

TODAY'S changing conditions in the boxboard field highlight the use of stains for coloring purposes.

The stain method is particularly economical for both mills and converters. And it offers the unique advantage of permitting you to maintain your reputation as a *reliable* source for specialty boxboards and containers. For, a continuous supply of staining colors can be anticipated.

Always a prime source for surface colorants, Heller & Merz has solved the problems brought about by present war restrictions.

And, of course, individual problems that you may have with reference to the use of stain colors are always welcome subjects at the technical service laboratories of Heller & Merz.

HELLER & MERZ DEPARTMENT

CALCO CHEMICAL DIVISION · AMERICAN CYANAMID COMPANY

BOUND BROOK, NEW JERSEY

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Co. conducted a round table discussion on Adhesives and Coatings. The panel was organized and directed by Walter M. Bain of the Glidden Company. Participants included: C. G. Albert, Edgar Brothers Company; J. H. Compton, General Mills, Inc.; Paul DeGuehery, Michigan Paper Company; G. K. Dickerman, Consolidated Water Power and Paper Company; J. E. Killinger, Penick & Ford, Ltd.; W. A. Kirkpatrick, Allied Paper Mills; L. B. Lane, Armour Glue Company; L. W. McFail, Oxford Paper Company; Bud Mueller, Hercules Powder Company; J. P. Strasser, Stein, Hall Manufacturing Company; R. VanKirk, Penick & Ford, Ltd., and James A. Wise, Kalamazoo Paper Company.

J. E. Killinger of Penick & Ford, Ltd., discussed chronologically the factors that led up to the successful usage of urea-formaldehyde resins, the type of paperboard necessary, and the effect different types of starches and the resins have on the degree of water resistance. The paper also described the effect time, temperature, pH and heat have on the water resistance developed by urea-formaldehyde resins and starches. Starch adhesives containing no resin, those containing starch emulsions, specific chemicals, waxes, wax emulsions, latex and reclaimed rubber were also discussed. Preliminary studies on the lack of correlation between the water resistance of a glue line as viewed from delamination versus wet bursting strength or 24-hour moisture absorption standpoint and the preferred method of preparing and using urea-formaldehyde resins and starches were discussed.

A round table conference was also conducted by the Acid Pulping Committee under the chairmanship of George H. McGregor of the Forest Products Laboratory. At this meeting there was a discussion of waste utilization cuprammonium viscosity, and plastics. P. N. McGovern and Dr. McGregor presented a brief review of "Greater Yields of Pulp from Wood and Utilization of Other Species to Provide More Pulp." Messrs. Haslanger and Dunlop of the Monsanto Chemical Company, and D. T. Jackson of the Hammermill Paper Company lead a discussion of plastics.

W. O. Hisey and C. E. Brandon of the New York State College of Forestry presented a paper on "Cuprammonium Viscosity of Pulp Using the Hoeppler Viscometer." This is a falling sphere viscometer, in which the tube is inclined and the sphere, rolling down the incline, forces the liquid through a crescent shaped annulus between the sphere and the tube wall. It was found that the Hoeppler Viscometer is a suitable instrument. The probable error of tests made was found to be less than 1%.

George L. Clark, E. Heuser and C. M. Sigvart of the Institute of Paper Chemistry reported by title on "The Action of Nitrogen Dioxide on Unbleached Pulp." In an attempt to replace chlorine entirely or partly by other bleaching agents, experiments were made on the effect of introgen dioxide upon unbleached pulp. When liquid nitrogen dioxide was introduced into an aqueous pulp suspension and the mixture heated for 1-1.5 hours at about 90°C., the lignin constituent of the unbleached pulp was changed in such a way that it could be removed by hot caustic extraction. Since the nitrogen dioxide in the presence of water is converted into a mixture of nitrous and nitric acids, the delignification cannot be carried to completion without considerable damage to the cellulose constituent which limits the use of nitrogen dioxide to the first stage of bleaching, comparable with the chlorination stage. After extraction with 1% sodium hydroxide for about one hour at about 55°C., the partly bleached pulp may be bleached to the desired color with alkali hypochlorite. If the brightness is limited to 70-75, a considerable amount of chlorine bleaching agents may be replaced by nitrogen dioxide. The pulp so bleached showed physical properties which were not very different from those bleached by the chlorine-hypochlorite method with cold caustic extraction between the stages. Likewise, the alpha-cellulose content of the two pulps was about the same, but the viscosity was lower for the nitrogen dioxide-bleached pulp, probably the result of the action of the nitrous and nitric acids formed. The indications were that the combined action of these two acids is responsible for the bleaching effect. The chief reaction seems to consist of oxidation but, to a limited extent also, of nitration of the lignin constituent.

"The Nature of Lignosulphonic Acids Fractionated by Chemical and Physical Methods" was the title of a talk given by title by W. Allan Schenck of the Institute of Paper Chemistry. After a critical discussion of the sulphonation of lignin in the sulphite cooking process on the basis of Freudenberg's structural formula for lignin, experiments are described which have as their goal the fractionation of lignonsulphonic acids from two widely different cooks by chemical and physical methods. These fractions were further investigated in order to determine whether the lignin is sulphonated by entrance of several sulphonic acid groups into the lignin molecule without degradation of the latter, or whether the lignin molecule is broken into smaller fragments each having one sulphonic acid group. Because of the impossibility of obtaining suitable equipment due to the present emergency, the final goal was not reached. The results so far obtained, however, indicate that a breakdown of the lignin molecule into smaller sulphonated fragments takes place.

Wednesday Luncheon Program

The Wednesday luncheon was held jointly with the Salesmans Association of the Paper Industry. Walter C. Daley of the Watab Paper Company presided as Chairman. The principal speaker was Col. Robert R. McCormick, Editor and Publisher of the Chicago Tribune.

Army, Navy, and W.P.B. Panel

Following the luncheon, R. J. Zaumeyer, Chief of the New Products Development Section, Pulp and Paper Div. of the War Production Board presented a paper on "Substitution and Conservation—The Role of Paper in War." Milton Schur of the Brown Company presided at this session, which was called for the purpose of giving further consideration to the addresses given on Tuesday by the officers and representatives of the Armed Services.

This session was continued on Thursday morning under the chairmanship of C. E. Waring, Frigidaire Div., General Motors Company.

Wednesday Technical Session

A group of miscellaneous technical papers was given at a session on Wednesday afternoon. William R. Swecker of the Seaman Paper Company presided.

Jules J. Perot, Jr., and Charles G. Schultz of the

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Rhinelander Paper Company gave a brief paper on "Photomicrographs by Projection." This described an apparatus and technique for making photomicrographs without the use of a camera.

"The Use of Urea Formaldehyde Resin as Beater Size for Paper" was the subject of a paper by Robert E. Myers and George V. N. Morin of The Resinous Products and Chemical Company. A new specially modified urea-formaldehyde resin has been developed which greatly simplifies the problem of introducing wet strength inexpensively into a wide variety of paper. This resin is completely water soluble and sold as a 50% solution, in which form it can be either readily diluted into the paper stock at any convenient point from the beater to the head box. Retention and development of wet strength in the finished paper are satisfactory at any pH below 5.0, optimum conditions being pH between 4.0 and 5.0 with at least 1-2% alum on the weight of pulp. At pH above 5.0 wet strength development decreases, although an appreciable wet strength is present as high as pH 8.0, curing of the resin is accomplished sufficiently in any regular drier section to show considerable wet strength, and the cure continues at room temperature to essential completion over a period of 2-8 days. Most efficient use of resin is found at low concentrations up to 3%, although in special cases the use of up to 5% may be justified. On ordinary wrapping papers the amount of beating of the pulp has no effect on the resin contribution to wet strength, expressed as wet-%-dry strength. On highly hydrated stocks as glassine, greaseproof, etc., the wet strength percent is slightly larger with increased hydration. This resin may be used as a tub size the same way as ordinary UF-resins are handled, and with similar results. It is reported the broke containing this resin is much easier to defiber than that containing melamine resins. Fundamental studies appear to indicate that the mechanism of retention is a species of adsorption and may be described in terms of the Freundlick adsorption isotherm.

W. S. Wilson and Harry E. Duston of the Merrimac Div. Monsanto Chemical Company presented two papers entitled "The Effect of Pulp Bond Density on Engine Sizing" and "Practical Application of Polycarboxylic Resin." Engine sizing is used primarily to reduce the capillary forces which suck liquid into the finished sheet. This reduction is accomplished by attaching small rosin particles to the fibers comprising the capillary walls, thereby raising their contact angle. Pulp and rosin are both cation exchangers and must be held together by a bond to accomplish this. Mathematical consideration and experimental evidence indicate that this bond strongly resembles trivalent Al ions common to both types of particles. Further experimental evidence and theoretical considerations lead to the conclusion that the strength of this bond determines the degree to which engine sizing may be accomplished. Pulp fibers are not homogenous and each has its personality. Therefore, there are numerous points on pulp fibers where the bond density exceeds the bond density of the ordinary rosin particles. These unusable pulp bonds are, therefore, wasted, unless a rosin particle of high bond density is attached to them. The bond density of rosin particles can be increased chemically and the results bring about such an increase through the synthesis and use of a new size are reported from both the theoretical and practical angles. From a practical standpoint this new size, Mersize, appears capable of not only increasing engine sizing, but also bringing about a reduction in the amount of size used and its cost.

John H. Graff of the Institute of Paper Chemistry discussed "The Number of Fibers per Gram of Pulp and Its Relation to Fiber Dimensions." There is a definite relationship between the number of fibers per gram of pulp and the weighted average fiber length of fibers longer than 0.1 mm. Because of this relationship, the total fiber length and the area of a given amount of pulp can be calculated from ordinary fiber dimensional data without counting the fibers. This in turn should make it possible to determine the effect of chipping, cooking, different beater treatments, and beaching and, probably, the relationship between such data and the physical characteristics of the finished paper.

Alkaline Pulping Round Table

The Alkaline Pulping Committee conducted a round-table discussion under the chairmanship of S. D. Wells of the Institute of Paper Chemistry. Among the subjects discussed was that of sulphate soap terminology. There has been an evident need for standardized usage of such terms in the trade.

Otto Kress and Robert H. Mosher of the Institute of Paper Chemistry presented a paper entitled "The Pulping of Extracted Yellow Pine Wood Chips." Solvent-extracted rootwood of southern pine was cooked by the kraft process under conditions which were varied over the commercial range; in no case was a yield over 37% (on the basis of the extractive-free material) obtained; this is equivalent to 30% on the basis of the moisture-free chips. The maximum strength of the rootwood pulp was about 50% of that normal jack pine kraft pulp. The low yield of pulp seems to be the result of a degraded condition of the wood prior to solvent extraction; this is indicated by such tests as cuprammonium viscosity, copper number, and alkali solubility. The presence of extractive in the wood appears to cause a modification in the mechanism of pulping, because the woods containing such extractives gave lower yields and pulps with lower strength values than the extractive-free wood. The fibers of the pulps obtained from rootwood hydrate immediately upon contact with water but do not develop normal strength on beating.

Otto Kress and Francis T. Ratliff of the Institute of Paper Chemistry also presented the following paper by title "A Comparison of Southern and Northern Kraft Pulps." An attempt has been made to find a reason for the well-known difference between pulps produced from southern woods and those from northern woods. The usual physical tests and chemical analyses gave no tangible results. Indications were obtained that the fiber-to-fiber bonding strength and the specific surface area may account in part for such difference, although this remains to be confirmed.

Papermaking Round Table

The Papermaking Committee under the chairmanship of Albert E. Bachmann of the Missisquoi Corporation conducted a round-table meeting devoted to a discussion of J. B. Gough's paper entitled "Cylinder Machine Vat-Circle Width" presented at the annual meeting. In this paper he pointed out that the problem of the vat-circle width is difficult, and that certain factors are possibly of major importance

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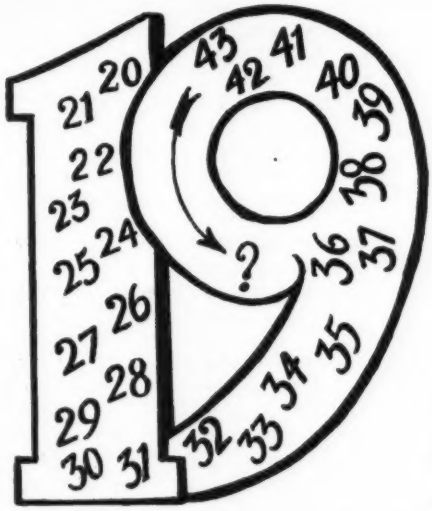

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in their effect on operation and formation. It is unlikely that there will be any further improvement in the formation on cylinder machines, especially at high machine speeds, regardless of the perfection of the approach, flow, circle, proportions, etc.

Plant Visits

Throughout the period of the meeting, open house was maintained by three large printing companies, the W. F. Hall Printing Company, R. R. Donnelly and Sons, and the Chicago Tribune. In connection with the latter, on Wednesday a trip was organized to demonstrate the paper loading and storage facilities. A motion picture was shown depicting the operations at the Ontario Paper Company and the Quebec North Shore Paper Company, the alcohol production plant at the former was shown. At 9:30 P. M. as guests of the Chicago Tribune, a large number attended the radio broadcast—The Northerners—sponsored by the Northern Trust Company.

Meeting Thursday, September 22

Vance P. Edwardes of the International Paper Company presided at a technical session on Thursday morning.

Two papers on mill sanitation were presented by members of the staff of the Institute of Paper Chemistry. J. W. Appling and B. F. Shema reported on "The Acclimatization of Bacteria to Disinfectants Used in the Paper and Paperboard Industry." This was a general discussion of acclimation of living organisms to injurious substances which had been given as an introduction to some extensive experimental work on the acclimatization of *Aerobacter aerogenes* to the disinfectant sodium pentachlorophenate. This organism was selected because of the frequency of its occurrence in slime. It has been trained or acclimated to grow on concentrations of sodium pentachlorophenate which was usually lethal for it—e.g., in two cases the organism grew on 0.230% of Santobrite (sodium pentachlorophenate). This concentration was 9.2 times the maximum concentration on which it grew prior to acclimatization. Striking increases in cell length were observed as the organism became acclimated. Not infrequently there were cells which were 25 times the normal length. It was also discovered that the test organism did not maintain its resistance unless it was grown on a nutrient medium which contained the disinfectant. These results suggest: (*a*) that some bacteria may become sufficiently acclimated to a given disinfectant so that the latter becomes ineffective and (*b*) that continuous exposure to the disinfectant is necessary in order to maintain the acclimatization acquired.

Willis A. Van Horn discussed "Possible Stream Pollutional Aspects of Mill Antiseptics." The use of slime control agents in pulp and paper mills may complicate the problem of stream pollution especially from the standpoint of the toxic effects of mill effluents to fish. The critical concentrations to fish of Lignasan, Merfenel, Nalco 21, Nalco 23, and Santobrite have been established. Average survival times of fish in various concentrations of these compounds have also been determined. It is apparent that, from the standpoint of stream pollution, the use of these compounds would be conditioned primarily by (1) their concentration necessary for effective use in the mill, (2) the extent to which the slime-controlling agent is adsorbed by the pulp fibers, (3) the white water and other water loss, and (4) the rate of dilution of the mill effluent in the stream. A method for the study of the toxicity of mill effluents was described.

"Paper Problems in Telephone Apparatus" was the subject of a talk by David A. McLean of the Bell Telephone Laboratories. A prominent feature of the Bell Telephone Laboratories' part in maintaining progress in communication engineering consists of detailed studies of hundreds of materials used in the telephone plant, evaluation of dozens of new materials annually and the development of special materials when none suitable are available. The critical uses of paper in communications equipment are those wherein it forms an electrically insulating component of apparatus, as in telephone cables, dielectric for paper capacitors and interleaving for coils, relays, and transformers. For such apparatus, large areas of paper in very thin layers must withstand potential gradients without failure for many years. Since telephone equipment is engineered to last for, roughly, a generation, the paper used must be exceptionally pure chemically, resistant to aging and free from corrosive or other harmful effects upon materials which it contacts. Perhaps nowhere is more expected of any organic material than is demanded of paper and its associated impregnants in the paper dielectric condenser. Some high-voltage type condensers are rated at continuous potentials of approximately 500 volts for each 0.001 inch thickness of dielectric. For this reason, and because each new improvement can be taken immediate advantage of through larger margins of safety, higher rated voltages or higher allowable operating temperatures, paper condensers have provided challenging problems in research.

"Electronic Heating of Nonconductors" was the subject of an address by G. C. Nonken of the General Electric Company. Electronic heating produces heat directly in materials which are normally nonconducting. The heating is produced uniformly through thick pieces and does not depend on a source of high temperature at the surface of the material. Such materials as paper, wood, plastics, porcelain, rubber, brick and many others are quite good insulators for normal 60 cycle voltage. When these materials are used as insulators for radio frequency voltages with frequencies of several million cycles per second, an appreciable power loss occurs in the insulation which is dissipated in form of heat throughout the insulating material. This property of most nonmetallic materials is the basis upon which the science of electronic heating of nonconductors is built. Industrial electronic heaters are available which convert ordinary alternating current power into high frequency power. The material to be heated is placed between electrodes or plates to which the high frequency voltage is applied. Heat is dissipated throughout the whole mass of material. Heating times for thick materials are reduced to minutes where the present methods of heating from an external high temperature source requires hours. Means are available to calculate the amount of high frequency power required for a particular heating job. The amount of heat dissipated in the material can also be calculated for a particular condition providing certain high frequency constants of the material are known. These electrical constants were determined for a group of resin bonded paper materials. Developmental tests indicate that one inch thick resin bonded paper plate stock can be heated uniformly to 130° C.

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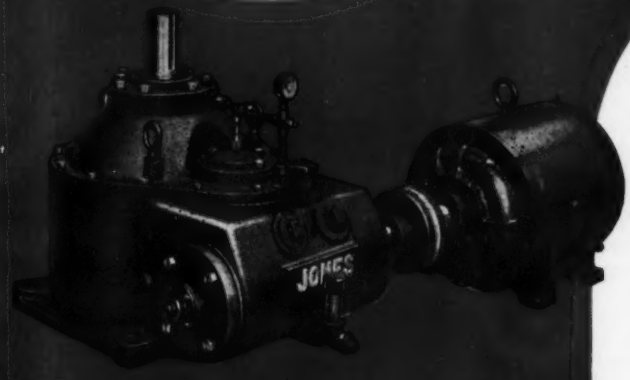

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in two minutes with electronic heating while the same material heated between platens press required 35 minutes for the internal temperature to get to 130°C. with a platen temperature of 140° C. The difference in time required to heat plate stock by these two methods increases rapidly with increasing thickness.

Case Studies Session

Harry Weston of Fritz Publications presided at a session devoted largely to the experiences of a number of large paper users in converting to paper products to meet the war emergencies.

Burton L. Trodson of the Mid-States Gummed Paper Company discussed "Water Resistant and Waterproof Tapes for Export Packaging."

H. H. Snyder, Packaging Engineer for the Stewart-Warner Corporation described the "Packaging of Electric Equipment."

H. R. Todd of the American Can Company described "An Appartus for Measuring Gas Transmission Through Sheets and Films." An inexpensive apparatus of simple design has been used for measuring the gas transmission rate of plastic sheets. The instrument provides a pressure differential across the sheet which remains nearly constant during the period of the test. The loss of volume from the higher or atmospheric pressure side to the lower pressure side is indicated by the movement of a short column of mercury, water, or other liquid, which passes through a glass capillary tube placed in a horizontal position. The tube is calibrated to indicate volume of gas transmitted through the film in unit time. The apparatus is sufficiently flexible to permit the testing of sheets and films under various conditions of humidity, temperature, and pressure. Different gases may also be substituted for air. Although the temperature of the test must be controlled from the outside, the humidity is controlled from within the instrument. Relative humidity conditions vary from dry to 100% may be maintained on both sides of the film. Determinations may be conducted in from 2 to 24 hours, depending on the speed of the gas transmission. Preliminary results appear to be reliable as shown by the checks which have been obtained with triplicate determination. The results show that the apparatus may have considerable value as a means of comparing the rates of gas transmission of the different types of plastics as well as in providing a means of studying the effects of temperature and humidity on the transmission rate. Some interesting results have been found by testing several types and thicknesses of plastic sheets under several conditions of temperature and humidity. Temperature and humidity facts are shown to have a much greater effect on gas transmission than might ordinarily be anticipated.

Container Testing Round Table

Under the direction of Arno W. Nickerson, the Container Testing Committee reviewed a large number of proposed TAPPI standard testing methods relating to paperboard and containers.

Thursday Luncheon Program

A. E. Montgomery of the J. O. Ross Engineering Corporation presided at the speakers program following the Thursday luncheon. An address was made by the Hon. A. E. Giegengack, Public Printer of the United States, and William J. Cassiday, Director of Purchases for the Government Printing Office, was present.

Water Vapor Permeability Session

Earlier this year the Technical Association received a request from Col. Georges Doriot of the Office of the Quartermaster General to investigate the subject of water vapor permeability of sheets and films and to develop a satisfactory procedure for evaluating this property. As a result of a meeting held this summer in Chicago in response to this request, a program of research was worked out. The results of this work constituted an important part of this session. W. H. Graebner of the Marathon Paper Mills Company presided as chairman of this session as well as of the committee that directed the research activities during the summer.

C. A. Southwick of the Shellmar Products Company opened the session with a review of "The Practical Aspects of Water Vapor Permeability Testing." He stated, in part that a standard method of water vapor permeability testing is needed by war procuring agencies for packing specifications and for civilian uses in valuating substitute materials. Such a standard test method will result in the grading of packing materials in terms of their water vaporproofness. The primary consideration is a testing method which is accurate and reproducible, then a test procedure which is safe enough for production control should be evolved. Supplementary tests should be developed to evaluate packing materials to estimate the durability of their water vaporproofness. These tests must give indices of various kinds of commercial packaging forming operations. All units material test cannot take the place of the final evaluation of a material in a test of a finished package. Post-war packaging will have many materials to draw on and many new products to package. The paper industry share of this business will depend upon a realization and appreciation of the problem and the ability to make structures to fit the need. Testing methods are the basis of research and quality control and must precede any production operation.

L. Boor and J. K. Dixon of the American Cyanamid Company presented a paper entitled "The Application of a Thermal Conductivity Method to the Determination of Water Vapor Transmission of Packaging Materials." In this paper the authors pointed out that an investigation has been made of a nongravimetric method of evaluating water vapor permeability of typical packaging materials. In principle, it consisted of a means of clamping a test substance between the two flanged members, providing a high water vapor pressure on one side, and low on the other, and measuring the increase of moisture contact on the dry side due to permeation of moisture through the membrane, by means of a sensitive electrical cell. This cell operates on the principle of change in thermal conductivity of air-water vapor mixtures with changes in water vapor concentrates. The whole assembly was an adaptation of the Permeameter, made by the Cambridge Instrument Co., originally designed for measuring permeability of balloon fabrics to hydrogen. The response, stability of readings and calibration of the instrument was described. Moisture vapor transmission of a variety of materials was determined on the permeameter by two methods and compared with that obtained on the same substance by two gravimetric methods (one of

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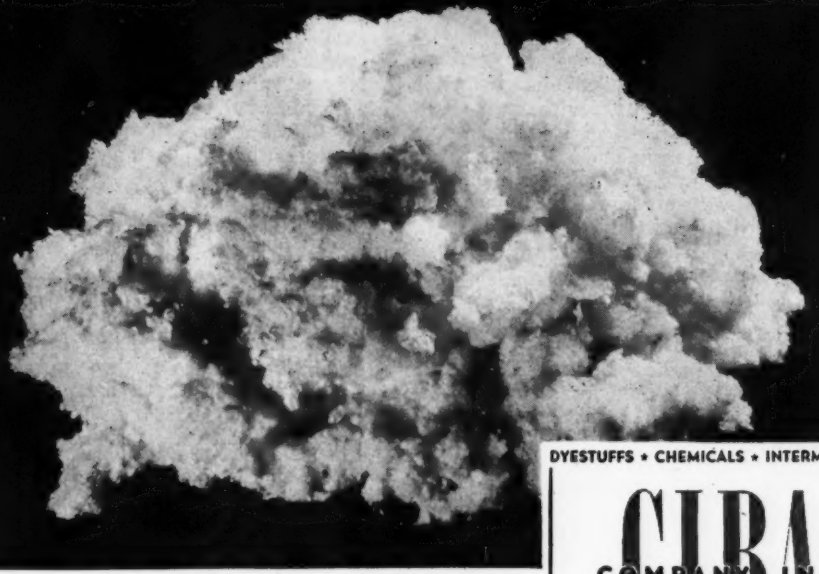

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which simulates the General Foods method). The two procedures used on the Permeameter were: (*a*) A specimen conditioned at 78°F. and 50% R.H. was clamped in the instrument, air saturated with water vapor was circulated through the lower space, and the increase in moisture content in the closed upper space was recorded as a function of time. The slope of the time-deflation curve was used as an index of permeability, and (*b*) the lower head of the instrument was filled with water, to within ⅛ inch of the lower surface of the test specimen. After clamping the specimen, dry air was passed at a constant known rate over the top surface of the sheet, and the increase in moisture content of the air due to permeation through the membrane was determined as a function of time. The two gravimetric methods of permeability gave a general correlation with Permeameter methods *a* and *b*. Charts showing the relative permeability of a variety of typical materials by the different procedures were given. Further experimentation using this apparatus is outlined, and other applications of the sensitive cell to problems of water vapor permeability were suggested.

George R. Sears, Harriet Schlagenhauf, Joseph Givens and Fowler Yett of the Institute of Paper Chemistry discussed "A Comparison of Methods for the Determination of Water Vapor Permeability."

C. G. Weber of the National Bureau of Standards gave a report based on its investigations during the summer of the water vapor permeability testing procedures.

George Sears presented "A Method of Creasing Paper for Testing Water Vapor Permeability.

Major James d'A. Clark of the Subsistence Research Laboratory of the Chicago Quartermaster Depot brought the meeting to an end with a presentation of the Special WVP Committee's "Recommendations for a Tentative Emergency Standard for Water Vapor Permeability Measurement."

Army and Navy Packaging Exhibit

Several trade associations of the industry met in Chicago during the week, in part, for the purpose of visiting the Armed Services Packaging Exhibit sponsored by the Technical Association.

All branches of the Army Service Forces, the Army Air Forces and the Navy were represented.

The Navy representatives included:

Bureau of Supplies and Accounts—Lt. (j.g.) W. S. Hassler, Lt. C. S. McNair, Ens. C. I. Elliot, Lt. (j.g.) G. L. Ireland, Lt. R. D. Elwell, Lt. (j.g.) R. A. Campbell, Comdr. O. P. Lattu and Lt. (j.g.) Robert Faegre. Navy Clothing Depot—Lt. (j.g.) W. T. Sheldon and Lt. G. J. Hughes. Bureau of Medicine and Surgery—Lt. P. T. Reese. Bureau of Ordnance—Lt. S. G. Atkinson. Navy Aircraft Factory — Lt. (j.g.) D. R. Weedon. Aviation Supply Office—Lt. Huflage. Marine Corps—Capt. T. W. Fred. Office Procurement of Materials—P. P. Kennedy and F. G. Barber.

The Army representatives included:

Engineer Corps—Capt. L. E. Trickle and Lt. B. E. Jones. Transportation Corps—Major J. K. Mount and Capt. George Wallerschein. Medical Dept. — Capt. R. J. Schulze, Capt. W. H. McIntosh and James D. Studley. Chemical Warfare Service—Capt. D. H. Danks and Lt. T. P. Steimetz. Signal Corps—Lt. W. F. Campbell and M. L. Jenkins. Quartermaster Corps—Major R. B. Hamilton, Capt. Wilford C. Lock and Capt. Herman C. King. Army Air Forces —Capt. R. A. Norris and W. D. Long.

Maj. Gen. A. D. Surles Specially Mentioned

Particular mention should be made of the courtesy of Major General A. D. Surles, Chief of the Bureau of Public Relations who very kindly accepted the Technical Association's request for authorization for the preparation of the exhibit and the participation of the Army in the conferences. The exhibit was organized with the splendid cooperation and effort of Stanley G. Somers, Director of the Exhibits Section, Bureau of Public Relations, War Department. The work in connection with the conferences was carried on under the direction of Major Malcolm J. Odell of the Army Service Forces.

Indebted to Rear Admiral W. B. Young

For the Navy's participation the Association is indebted to Rear Admiral William B. Young (SC) USN., Paymaster General of the Navy and Chief of the bureau of Supplies and Accounts. The Navy's section of the exhibit and the participation of the Naval Officers in the technical conferences was prepared under the direction of Lt. (j.g.) Winfield Scott Hassler of the Bureau of Supplies and Accounts.

At the Paper Prevents Bottlenecks Exhibit held in connection with the Annual Meeting of the Technical Association of the Pulp and Paper Industry at the Hotel Commodore in New York (Feb. 15-18, 1943), the War Department participated with an Army display which was prepared by the Bureau of Public Relations Exhibit Section. This was the first showing of the utilization of paper and converted paper products for the protection of Army supplies and equipment. Subsequently the Army exhibit was enlarged for use at the meeting of the AMA in New York. During the summer the exhibit was sent to the Ordnance Proving Grounds at Aberdeen, Md. The exhibit at the Palmer House (Sept. 21-24, 1943) was specially designed and constructed for the Army and Navy Requirements Conference of the Technical Association of the Pulp and Paper Industry to feature the uses and necessity of technical papers for the protection of supplies and equipment for the Armed Forces.

An exhibit theatre was constructed as an adjunct to the exhibit. A number of sound films depicting the part that paper plays on all fronts in this war were shown.

The attendance at the conferences and in the Exhibition Hall reflected the keen interest in the problems of the Army and the Navy as well as the fine organizing abilities of those men responsible for the Army and Navy Requirements Conference. The Conference provided an unusual opportunity to promote the War Effort through the assembly of technologists and executives of the paper and related industries and the officers of the Armed Services who are directly responsible for the delivery of supplies and equipment to the battle fronts in perfect condition.

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The technical program and the exhibition were outstanding successes and demonstrated the benefit of close cooperation of all the interests that were brought together and focused their attention on the major problems in BACKING THE ATTACK with the full resources of the paper and allied industries.

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R. C. Adams, The Marvellum Co.
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J. C. Alden, Dixie Cup Co.
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W. J. Allard, Ford Motor Co.
H. A. Allen, Port Huron Sulphite & Paper Co.
M. P. Alogne, Storrs & Bement Co.
A. H. Andersen, Individual Drinking Cup Co.
L. H. Andrews, Northern Paper Mills.
R. W. Andrews, Minnesota and Ontario Paper Co.
S. M. Andrews, P. L. Andrews Corp.
C. W. Aneshansel, Hilton David Chemical Co.
J. Alfred Anglado, Sylvania Industrial Corp.
C. E. Apelgren, St. Regis Paper Co., Taggart Corp.
O. C. Ard, Pratt & Whitney Corp.
G. H. Argue, Wyandotte Chemicals.
R. E. Armstrong, Hawley Products.
T. F. Arnoldi, Hinde & Dauch Paper Co. of Canada.
S. I. Ayonovsky, Northern Regional Research Laboratory.

E. H. Ashley, General Electric Co.
F. B. Asman, Central Michigan Paper Co.
A. A. Atkeson, International Paper Co.
M. J. Auchter, Hoberg Paper Mills.
H. O. Augustin, Century Electric Co.
R. P. Aument, American Box Board Co.
A. W. Ayles, American Cyanamid & Chemical Co.
Gene Abson, Chicago Testing Lab.
G. A. Albert, National Vulcanized Fibre Co.
K. P. Alcorn, Resinous Products & Chemical Co.
R. C. Alden, Watervliet Paper Co.
N. D. Alfreto, Sherman Paper Products Co.
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J. Anderson, Dow Chemical Co.
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R. H. Atkinson, Beckman Co.
R. W. Alderson, American Tissue Mills.
Harold R. Alley, Tested Papers of Ame., Inc.
Nils Anderson, Jr., WPB.
S. I. Anderson, Hooker Electrochemical Co.
W. H. Anderson, Stevens Paper Mills, Inc.

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C. L. Bachelder, Hercules Powder Co.
C. A. Bader, The Crosley Corp.
R. Bagnall, Kellogg Co.
R. R. Baker, Westinghouse Electric & Manufacturing Co.
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A. Barkman, Sherwin-Williams Co.
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Roy M. Tucker, Blake-Moffitt & Towne.
H. S. Turner and J. A. Turner, E. I. du Pont de Nemours & Co.
Robert B. Turner, Ashtabula Corr. Box Co.
R. Tutt, Jr., Peter Cooper Corp.
A. E. Tyner, Southern Advance Bag & Paper Co., Inc.
H. R. Thies, Goodyear Tire & Rubber Co.
Carl A. Thoms, Kennedy-Gardiner Bag Co., Inc.
S. M. Tobey, Tobey-Fine Papers, Inc.
Sherman H. Tompkins, Crescent Paper Co.
A. E. Tyner, Southern Bag & Paper Co.

U

Richard M. Upright, The Don Chemical Co.
J. Donald Urquhart, Resinous Products & Chemicals Co.
Dr. & Mrs. R. W. Kenneth Ulm, Ohio Boxboard Co.
D. D. Uong, Fitchburg Paper Co.

V

L. G. Vande Bogart, Crane Co.
Robert W. Van Kirk, Penick & Ford, Ltd.
G. P. Vincent, Mathieson Alkali Works, Inc.
Rex Vincent, Bulkley-Dunton Pulp Co.
H. K. Vinton, Paper Trade Journal.
Frank J. Vitkus, Simmons Company.
Edward H. Voigtman.
R. F. Vokes, Dilts Machine Works.
Herbert G. Vore, American Seal-Kap Corp.
Henry Vranian, The Chesapeake Corp. of Virginia.
V. V. Vallandigham, Kelco Co.
R. J. Vander Wal, Armour & Co.
Lambert Van Roy, Central Paper Co.
Steinle V. Vernon, S. C. Johnson & Son, Inc.
John Vidovic, Cuneo Press (Packaging Div.)
Charles D. Viergiver, Stecher-Traing Litho. Co.
P. O. Vogt, General Electric Co.
F. C. Vaughan, Hummel Ross Fibre Corp.

W

Charley L. Wagner, Marathon Paper Mills Co.
Kenneth A. Wagner, Air Service Command.
Alfred S. Walden, Walden Sons & Mott, Inc.
Anton D. Walker, U.S.N., Great Lakes, Ill.
L. J. Walker, Central Paper Co.
H. E. Walter, Wood Conversion Co.
Frank B. Wamsley, Strauss Paper & Products Co.
Frank E. Wantz, Container Corp. of Am.
H. O. Ware, Hercules Powder Co.
Vincent F. Waters, Southern Pulp & Paper Journal.
V. E. Watts, American Vitumuls Co.
C. G. Weber, National Bureau of Standards.
C. R. Webster, Dow Chemical Co.
Wm. J. Weed, Niagara Alkali Co.
Philip Weisberger, Weisberger Bros., Inc.
A. J. Weisner, Bermingham & Prosser Co.
L. E. Wellman, Nekoosa Edwards Paper Co.
Sidney D. Wells, Institute of Paper Chemistry.
Herbert B. Wenberg, Nicolet Paper Corp.
A. F. Wendler, E. I. du Pont de Nemours & Co.
Leo Wertgame, Bermingham & Prosser Co.
Wm. Bond Wheelwright, Callaway Associates.
George H. Whiteside, Container Corp. of America.
Arthur L. Whiton, Office of Chief of Ordnance.
V. W. Whysong, International Harvester Co.
G. Russell Widger, Wishnick-Tumpeer, Inc.
E. J. Wiegand, Eastman Kodak Co.
R. R. Wiggins, Thomas M. Royal & Co.
I. L. Wilcox, Sealright Co., Inc.
L. C. Wilcoxen, Lt. CEC, USNR, Central Spare Parts Warehouse.
Raymond H. Wiles, International Paper Co.
Arthur P. Williams, Dennison Mfg. Co.
D. G. Williamson, Williamson Adhesives, Inc.
William S. Wilson, Monsanto Chemical Co.
Roger R. Wilterding, Ace Carton Corp.
F. P. Winslow, Shellmar Products.
James A. Wise, Kalamazoo Paper Co.
C. J. Wittrock, The Paragon Paper Co.
K. M. Winrich, Cornell Wood Prod. Co.
Frank Wolf, J. O. Ross Engineering Corp.
Robert H. Wood, Simplex Paper Corp.
Samuel A. Woodruff, Battelle Memorial Institute.
E. A. Woolwine, Jr., Bradks Paper Co.
H. F. Woody, Chillicothe Paper Co.
Robert W. Worden, American Resinous Chemicals Corp.
Burchard V. Wright.
Charles Joseph Wright, Chillicothe Paper Co.
George A. Wright, E. I. du Pont de Nemours & Co., Inc.
J. G. Wright, A. M. Meincke & Son, Inc.
Joe Waber, Rex Paper Co.
D. Irvine Walker, Standard Oil Co. (Ind.).
Jack Wandtke, Heller & Merz.
Joseph A. Warren, S. D. Warren Co.
H. B. Weis, Central Fibre Products Co.
Paul E. Wenaas, Simoniz Co.
C. R. Whipple, Beloit Iron Works.
W. O. Whitaker, Marinette Paper Co.
Whysong, V. W., International Harvester Co.
Merle R. Wilkins, Bryant Paper Co.
Edward J. Willey, Hercules Powder Co.
D. V. Williamson, Williamson Adhesives, Inc.
John A. Williamson, Carborundum Co.
T. F. Willis, Willis Sales Co.
G. M. Woodruff, Procter & Gamble.
Wm. J. Ward, Watab Paper Co.
T. A. Wark, Watab Paper Co.
L. J. Weber, General Electric Co.
John B. Weidner, Hoberg Paper Mill Co.
Fred V. Wellington, Western Gear Works.
H. E. Weston, Fritz Publications, Inc.
R. A. Wilkins, Bird & Son, Inc.
Albert Wilson, Pacific Pulp & Paper Industry.
Geo. A. Wishart, Eastman Kodak Co.
Myron Wittmer, Cheney Pulp & Paper Co.
Vernon Woodside, Mathieson Alkali Works.

Y

Merrill A. Yountz, Drackett Co.
C. A. Young, West Virginia Pulp & Paper Co.
Paul H. Yoder, Pyroxylin Products, Inc.
Albert Yraola, Hinde & Dauch Paper Co.

Z

R. J. Zaumeyer, War Production Board.
Edward Zelinski, Edison G. E. Appliance Co.
Jos. M. Ziemann, Strauss Paper & Prod. Co.
Lester R. Zimmerman, Milprint, Inc.
G. A. Zinkil, Container Corp. of America.
Irving Zuckev, Oneida Paper Products, Inc.
Samuel Zweig, Milprint, Inc.
Walter Zwoyer, Henry Heide, Inc.
W. R. Zwecker, Luaman Paper Co.

In the Groove
THE DIFFERENCE SHOWS

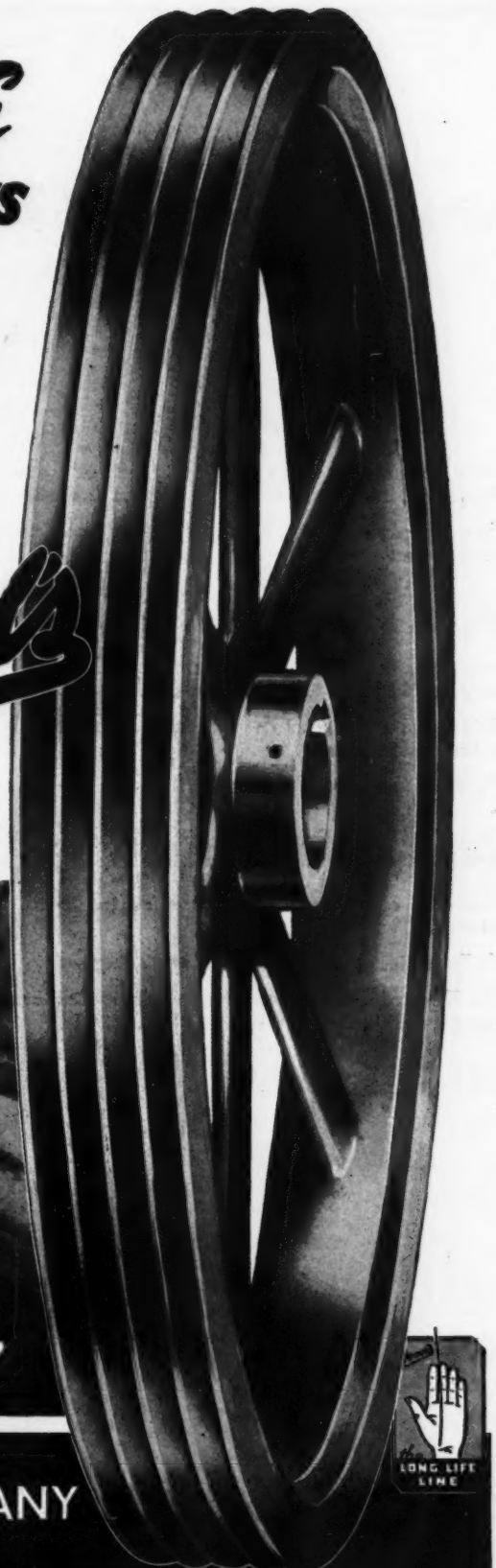
Wood's Sheaves are engineered to provide for a snug fit and maximum grip by the V-Belts. Grooves are precision machined, uniformly spaced and absolutely true, with side walls at proper angles. Then, the belts being full moulded, flexible and resilient, perfectly match the grooves so that the harder the pull the greater the wedging action of the belts in the grooves . . . and the higher the percentage of power transmitted. In fact, efficiencies often run as high as 98%.

Let us give you full details about our line of nearly 2800 Wood's V-Belt Drives ranging from ¼ H.P. to 100 H.P. with a wide selection of center distances for each. Our 64 page V-Belt Drive Catalog will be sent on request . . . or ask your nearest Wood's Distributor about them.

EVERYTHING IN TRANSMISSION
Bearings • Collars • Clutches • Couplings
Contactors • Hangers • Pillow Blocks • Pulleys
V-Belt Sheaves and Complete Drives.

Wood's

V-BELT DRIVES



T. B. WOOD'S SONS COMPANY
CHAMBERSBURG, PA.
BRANCHES: 387-391 ATLANTIC AVE., BOSTON, MASS. · 94 PLANE ST., NEWARK, N. J. · 425 FIRST AVE., PITTSBURGH, PA.

You should be acquainted with The Twins

AMYLOX

and

KALOX

They promote retention of pulp, starch and other materials including wet strength resins on the wire.

Your supply of pulp, starch, etc. has been cut down: why not let

AMYLOX and KALOX

conserve these and put them in the paper where they should be instead of down the sewer.

This process does not degrade the paper and formation is always improved.

With the use of

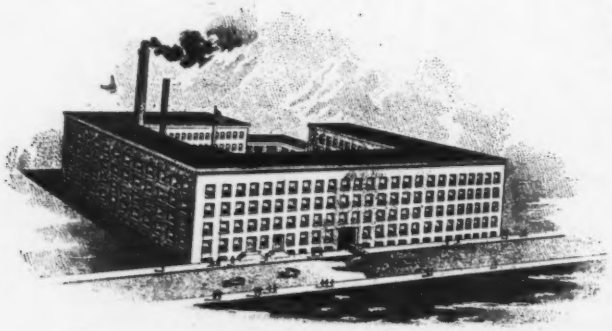
AMYLOX and KALOX

you can effect marked economies in operating and furnish.

No Royalties, Licensing or other Entaglements.

Mr. Edward A. Shallcross, Consulting Engineer, is in charge of this Department.

The Home of AMYLOX and KALOX



KALI MANUFACTURING CO.

427 Moyer Street **Philadelphia 25, Pa.**

FINANCIAL NEWS

New York Stock Exchange

High, Low and Last for Week Ending September 25, 1943

STOCKS

	High	Low	Last
A. P. W.	1⅞	1⅞	1⅞
Armstrock Cork Co.	40¾	39	39½
Celotex Corp.	14⅛	13	13
Celotex Corp., pf.	18¾	18	18
Certain-Teed Products Corp.	6⅝	6	6⅛
Certain-Teed Products Corp., pf.	64¾	60¼	64¾
Champion Paper & Fibre Co.	21	21	21
Champion Paper & Fibre Co., pf.	107½	106	107½
Congoleum Nairn Co.	23½	22¾	23
Container Corp. of America	21⅞	20¾	21
Continental-Diamond Fibre Co.	13	12½	12⅝
Crown Zellerbach Co.	16⅛	15⅝	16
Crown Zellerbach Co., pf	99½	98	98
Dixie Cup Co.	15½	14¾	15½
Dixie Cup Co.,—A	44¾	43½	44
Flintkote Co.	21⅜	20¾	21⅛
Flintkote Co., pf.	107¾	107¼	107¾
Robert Gair	3¼	3	3
Robert Gair, pf.	12⅝	12½	12⅝
International Paper Co.	13¼	12⅝	13¼
International Paper Co., pf.	68¼	64⅞	67⅜
Johns-Manville Corp.	91	90	91
Johns-Manville Corp., pf.	....	....	....
Kimberly-Clark Corp.	31¾	31⅜	31⅜
MacAndrews & Forbes	26¼	26	26¼
MacAndrews & Forbes, pf.	....	....	....
Masonite Corp.	38½	37½	38½
Mead Corp.	8¾	8⅛	8⅛
Mead Corp., pf. A—6%	88	86	86
Mead Corp., pf. B—5½%	78	76¼	77½
National Container Corp.	13¼	12⅝	13
Paraffine Companies, Inc.	44¾	44	44¼
Paraffine Companies, Inc., pf.	....	....	....
Rayonier, Inc.	14½	14⅛	14⅜
Rayonier, Inc., pf.	31⅝	30¾	31⅜
Ruberoid Co.	27¾	27⅛	27⅜
Scott Paper Co.	41⅝	40	41⅜
Scott Paper Co., pf.	112	111¾	112
Sutherland Paper Co.	29½	29⅛	29⅛
Union Bag & Paper Corp.	10¾	9⅝	10⅛
United Paperboard Co.	4⅜	4⅛	4½
U. S. Gypsum Co.	75	72¼	75
U. S. Gypsum Co., pf.	176	175	176
West Virginia Pulp & Paper Co.	15½	14¼	15⅛
West Virginia Pulp & Paper Co., pf.	110	110	110

BONDS

Abitibi Pulp & Paper Co. 5s '53	69	69	69
Celotex Corp. 3¾s '55	101¼	101¼	101¼
Certain-Teed Products Corp. 5½s '48	101¾	101¼	101¼
Champion Paper & Fibre Co. 4¾s '50	....	....	....
International Paper Co. 6s '55	107¾	107	107⅛
International Paper Co. 5s '47	104	103⅞	104
Mead Corp. 3½s '53	....	....	....
West Virginia Pulp & Paper Co. 3s '54	104¼	104¼	104¼

New York Curb Exchange

High, Low and Last for Week Ending September 25, 1943

STOCKS

	High	Low	Last
American Box Board Co.	7⅞	7½	7⅞
Brown Co., pf.	....	....	....
Great Northern Paper Co.	34½	34¼	34⅜
Hummel-Ross Fibre Corp.	4½	4½	4⅝
St. Regis Paper Co.	3½	3¼	3⅜
St. Regis Paper Co., pf.	133¾	131½	133¾
Taggart Corp.	4	4	4

BONDS

American Writing Paper Co. 6s '61	98½	98½	98½

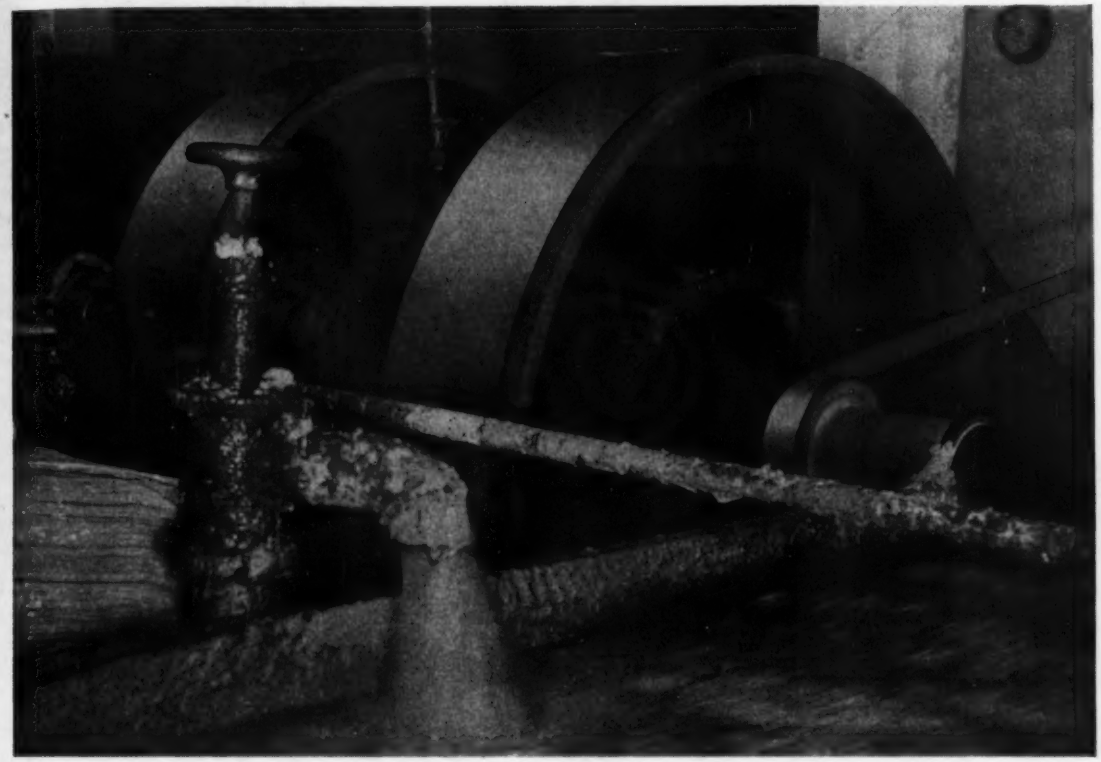
Celotex Earns 58 Cents

The Celotex Corporation for the ninth months ended July 31, reports a net income of $483,046 after taxes and charges, equal after preferred dividends to 58 cents a share on 638,410 common shares; year ago $837,940 and $1.14 a share. The 1943 profit is after non-recurrent writeoff of $225,254 unamortized discount on debentures.

Hummel-Ross Profits Off

The Hummel-Ross Fibre Corporation for the thirty-six weeks to September 4, reports a net income of $224,449, or 50 cents a common share, compared with revised net income of $312,772, or 73 cents a common share for thirty-six weeks to September 5, 1942; net sales, $3,390,458, against $3,557,606.

TANNATE WATERSHED



It's the Belt for Jobs Like this

For driving equipment in paper mills where hot, humid conditions often exist, Tannate Watershed Leather Belting proves an ideal choice. A typical example is shown in the above photo taken at a midwestern paper mill. There the 20" double Tannate Belts have been giving excellent service on beater drives ever since the first was installed over 6 years ago.

Made with waterproof cement and treated to resist moisture, Tannate flat leather belts keep machines running at Top effiency, without trouble and with very little maintenance. (Adverse atmospheric conditions will not cause plies or laps to separate.)

Tannate has exceptional pulley grip with great strength and lasting qualities. It is not affected by machine oils or many weak chemicals.

Reports from numerous paper mills using Tannate show real savings. We'll gladly send you our bulletin that tells about them in more detail.

FREE—A handy Belt Length Calculator will be sent you on request. It figures belt length quickly, accurately.

Carries nearly full load . . . even when damp!

RHOADS Tannate WATERSHED LEATHER BELTING

Established 1702

J. E. RHOADS & SONS

35 North Sixth Street, Philadelphia 6, Pa.

NEW YORK • CHICAGO • ATLANTA • CLEVELAND

Stuart J. Saks Dead

BALDWINSVILLE, N. Y., September 27, 1943—Stuart J. Saks, president of the Morris Machine Works, died in the University hospital September 5.

Mr. Saks, who was 52, was stricken at his summer home at Mexico Point and taken to the hospital by ambulance.

A veteran of the first world war and head of one of Onondaga county's largest industries outside of Syracuse, Mr. Saks was born at Blossville, Pa., and came to Syracuse as a youth. He graduated from the old Syracuse high school and from Syracuse university.

He was a captain in the Second U. S. Cavalry during the last war but was known best for his service after the armistice as assistant provost marshal in Paris. With headquarters in Rue de St. Anne, he handled the cases of all American soldiers found AWOL in the French capital and became known as "King of Paris."

Following the war, Mr. Saks was in newspaper work for a time and served with International News Service in New York and The Associated Press in Pittsburgh. He then turned to manufacturing and had executive positions with several companies before he joined the Baldwinsville company about three years ago.

Mr. Saks was made president of the Morris company two years ago, directing it in increasing activities as it became busy with war work.

He also was active in the civic life of this village, serving for a time as president of the chamber of commerce. He was a director of the United War Fund campaign conducted recently in Baldwinsville and was president of the Seneca Golf club in 1942. Mr. Saks was a member of the Syracuse Rotary club and was a former president of the Syracuse University Alumni Association in Baldwinsville.

Joins Staff of Reinhold-Gould

Henry Yohalem, well known printing executive, has joined the Sales Staff of Reinhold-Gould, Incorporated, paper merchants at 261 Walton Avenue, New York.

Mr. Yohalem brings with him twenty-four years of varied, intensive and interesting experience in the Graphic Arts.

Returning from overseas duty with the armed forces in the First World War, Mr. Yohalem became associated with The Diamond Press, one of this city's outstanding letter-press organizations. After one year he was made a member of the firm and served continuously as an officer of the corporation until the latter part of 1942.

Besides his work as treasurer, Mr. Yohalem interested himself in plant production, management and devoted a part of each day to selling. It is not strange therefor, that he is well and favorably known not only to many national advertisers and advertising agencies . . . but also to all the better suppliers of materials and processes in the Graphic Arts.

His complete knowledge of press-room and management problems together with his understanding of paper should make him a valuable addition to the Reinhold-Gould sales organization.

We're in it for the duration

SINCE 1828
We have served the industry well, with the finest in Paper Mill Machinery.
NOW
our entire manufacturing facilities are engaged in turning out material for the mightiest and most formidable fighting machine our country has ever known.
While we cannot give you typical peacetime SW Service, we can supply you with replacements — under proper priority rating, of course.

THE SMITH & WINCHESTER
MANUFACTURING COMPANY
PLANT AND OFFICES AT SOUTH WINDHAM, CONNECTICUT

OPA Rules on Kraft Differentials

WASHINGTON, D. C., September 29, 1943—Where manufacturers of kraft wrapping papers and certain bag papers and bags had an established practice of selling directly to purchasers other than distributors at prices in excess of those to distributors, they may add their customary differentials to the maximum prices, the Office of Price Administration announced today.

Certain manufacturers have cutomarily added differentials on sales directly to industrial, institutional and commercial users and other purchasers apart from distributors, and today's action permits continuance of that established trade practice.

Differentials actually used during a period of slightly more than a year, from October 1, 1940, to October 15, 1941, will be permitted, but in no event may they exceed the appropriate mark-ups established for sales by distributors.

Today's action is contained in Amendment No. 9 to Maximum Price Regulation No. 182 (Kraft Wrapping Papers and Certain Bag Papers and Certain Bags) effective September 30, 1943.

As these products are sold to firms, stores, institutions, etc., and not to the public, consumer levels are not affected by today's action.

Allows Claims of Algonquin Employees

OGDENSBURG, N. Y., September 27, 1943 — Announcement is made here that Referee Ambrose G. Ginnelly, of the State Labor Department, has allowed claims of mill employees at the Algonquin Paper Mill for unemployment insurance holding that the plant closed primarily because of curtailment of coal supplies, shortage of pulpwood and shipping difficulties. The ruling was received with interest here as a labor controversy was involved in proceedings held here before Referee Ginnelly several weeks ago when he heard testimony of the claimants for unemployment insurance. If he had ruled that the labor dispute was the principal cause of the shutdown the workers would not have been eligible for the unemployment benefits. The unemployment insurance division had first ruled that the workers were not entitled to the insurance because of the labor dispute. The workers took exception and asked for a hearing before the referee. The result is a decision in their favor, reversing the original decision of the division. Frank A. Augsbury, owner of the mill which has been closed for several months, appeared at the hearing early in the summer and declared that the labor dispute was one of the principal factors in his decision to close the plant. He stated at that time that he did not want to oppose payment of benefits.

Cornwall Mill is Sold

CORNWALL-ON-HUDSON, N. Y., September 27, 1943 —The Roudout Paper Mills, Inc., have sold their mill here to the Interstate Container Corporation and the plant will be operated under the style of Cornwall Paper Mills, Inc. The officers of the company are Jno. F. McKenney, president; Saul L. Epstein, treasurer; Louis M. Oppenheim, secretary and W. Thomas, superintendent. The mill which started operations this week will make .009 to .012 point corrugating with a capacity of 50,000 lbs. 24 hours.

SOYA PROTEINS

For The Paper Industry

PROSEIN* — NOW AVAILABLE

—mechanically refined soybean protein adhesive product. For use in paper coatings, extending casein in paper coatings, washable wallpapers, sizes, emulsifying and stabilizing waxes, surface sizing and laminating paper. Currently available without priority. Contracts offered.

ALPHA PROTEIN* — **—our total production of Alpha Protein, the chemically isolated soybean protein, is temporarily required for direct war uses and contract commitments.**

*TRADE MARK REGISTERED U. S. PAT. OFF.

★ **THE GLIDDEN COMPANY** ★

SOYA PRODUCTS DIVISION - 5165 W. MOFFAT ST., CHICAGO, ILL.

Tells Publishers to Plan for Less Paper

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., September 27, 1943.—"There is going to be less paper available to you for publishing books in 1944 than there has been in 1943," said Meiric K. Dutton, Chief of Distribution of the Printing and Publishing Division, War Production Board, to the Bookbuilders of Boston at the first meeting of the season at Schraff's West Street Restaurant, Wednesday evening, September 22."

"Publishing Faces a Third Year of War," was the subject of Mr. Dutton's address, which he began with the words: "You men of the book printing and publishing industry are familiar with the 17th century expression, 'With 26 soldiers of lead, I have conquered the world.' The shadow of these 26 soldiers of lead, when thrown on paper to form the printed word, provides the greatest force in the world—both in peace and in war. "The exact amount of the future curtailment has not yet been determined because all of the pertinent facts are not yet available," said the speaker. "Sufficient facts are known, however, to make it appear inevitable that you will suffer another cut of at least ten per cent with the advent of the new year. It may be greater than ten per cent, but I trust that such will not be the case. To look beyond the first quarter of 1944 for a ray of hope that the situation may improve during the year would be simply crystal-gazing. No one can tell you the amount of wood that will be cut this winter for shipment on the spring floods because it will depend on the severity of the winter and the character of the floods as well as upon the available manpower.

"What we can tell you is that the back-log of wood and of wood-pulp, plus the cutting that can be made immediately available, will not be more than enough to carry us through to May of next year without very substantial reductions all along the line. Our inventories of wood and of woodpulp are down, as you have already been told, by 22 to 33 per cent.

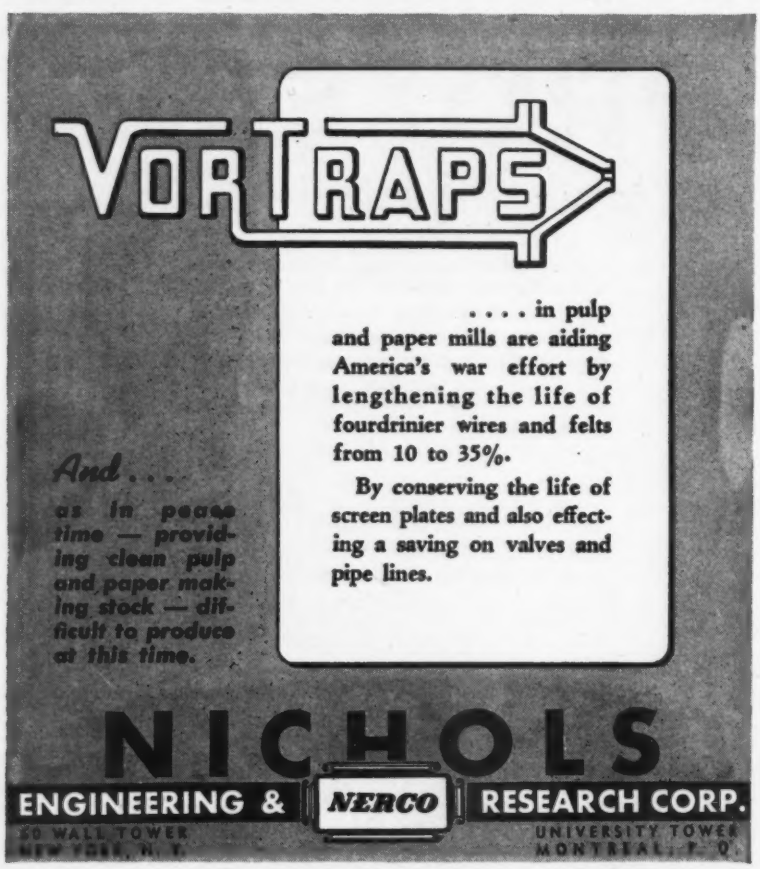
"From here on, we are dependent upon the actual, current receipts of wood at the mill. Even this picture, however, is not entirely black. I do not believe it is a tenable contention that the Printing and Publishing Division has imposed an important curtailment on any segment of the industry except after a most exhaustive search to assure that the need for curtailment existed. This search has not been limited simply to an examination of the existing supply, but has included a thorough analysis of all possible methods for increasing the supply.

"With relation to wood and woodpulp, we are especially fortunate in that Harold Boeschenstein, director of the Production Controls Bureau of the War Production Board, has been designated as Coordinator of Forest Products. In this capacity, Mr. Boeschenstein's aim is to increase the production of wood for all purposes and to coordinate the flow of wood and wood products to the various wood-consuming industries represented in the War Production Board by the following divisions: Lumber and Lumber Products Pulp and Paper, Containers, and Printing and Publishing.

"A House interstate subcommittee, of which Representative Lyle H. Boren of Oklahoma is chairman, has interested itself in the production of wood and woodpulp both in this country and Canada. Within the month, it has made an exhaustive analysis of wood, woodpulp and paper production, and the cooperation of many agencies has been obtained to promote woodcutting. The Boren Committee is also making itself felt in the reduction and conservation of paper in governmental printing. A considerable amount of progress has taken place along this line and more will follow.

"Magazines and newspapers which reach farming areas for some time have been conducting a campaign to have farmers cut wood for woodpulp during the winter months. Every county agent in every area where such cutting is feasible is cooperating in this program. It is too early to estimate the results of this and other coordinated plans, but considerable assistance is anticipated.

"I tell you these details not with any belief that the resulting benefits will be sufficient to forestall at least a further ten per cent curtailment next year; but to assure you that


VORTRAPS
. . . . in pulp and paper mills are aiding America's war effort by lengthening the life of fourdrinier wires and felts from 10 to 35%.
By conserving the life of screen plates and also effecting a saving on valves and pipe lines.
And . . .
as in peace time — providing clean pulp and paper making stock — difficult to produce at this time.
NICHOLS
ENGINEERING & NERCO RESEARCH CORP.
50 WALL TOWER NEW YORK, N. Y.
UNIVERSITY TOWER MONTREAL, P. Q.

every possible step is being taken to keep future and possible progressive curtailments to the absolute minimum.

"In this connection, it appears advisable to bring again to your attention that no accurate and complete figures of the requirements of this industry are available. About six months ago, the Bureau of Census at the request of our Division made a sample survey of all segments of the industry. The Census report of this survey has been of great value in determining our broad requirements, but will prove to be inadequate as materials become increasingly scarce. The Newspaper Section issued, on September 4, a Newspaper Survey form on which all newspaper publishers are to report their tonnage quota, receipts and inventory of print paper by quarters for 1943 and their circulation and print paper consumption by quarters for 1941, 1942, and 1943. A similar survey of the Magazine field is under immediate consideration.

For the purpose of determining from these surveys the future needs of these segments of the industry and to assist in the analysis of appeals under the newspaper and magazine orders, a half dozen top-flight executives in each of these fields have joined the staff of the Division as consultants. I hope that, at such time as Mr. West makes the call, as fine a representation may be obtained from this segment of the industry.

In completing a summary of the paper situation, I should mention Order L-120, especially Schedule II of that order, which was amended on August 28 to reduce the maximum weights in which paper for use in book publishing may be made. Order M-241, administered as is L-120 by the Pulp and Paper Division, is also of pointed interest to you in at least two of its provisions. The August 4th amendment of this order limits your inventory of each grade of paper after the first of the year to a 30-day supply. Unlike its predecessor, it does not limit the amount of paper which a mill may make from its allotment of pulp. This will enable many mills to increase their production of paper through the introduction of extenders such as de-inked stock. Order M-241-a is of only secondary interest to you; but it demonstrates that the Pulp and Paper Division is actively reducing the amount of pulp permitted to be used in the manufacture of most pulp and converted paper

The "Whalers" may justly be called the "Sub-Chasers" of old. Their job called for knowledge, skill, and above all, daring. They stole up on their prey in small boats, hurled the harpoon into the mammoth whale as he surfaced for air. The whale madly thrashed about, towing the boat until tired out; then the whale-men hauled in on the line and the "mate" lanced the leviathan in a vital spot. This most dangerous and spectacular kind of big game hunting was the foundation of numerous New England fortunes.

Compared to whaling, the weaver's art is undramatic, yet it also takes years of experience, knowledge and skill. In this combination lies the secret of success of the **DRAPER FELT.**

Draper Felts Favor Efficiency

DRAPER BROTHERS COMPANY

Woolen Manufacturers Since 1856

CANTON, MASS.

OUR REPRESENTATIVES *to serve you*

L. H. BREYFOGLE, Kalamazoo, Mich.

W. L. CAMPBELL, Savannah, Ga.

RALPH E. BRIGGS, Canton, Mass.

E. R. LELOFF, Vancouver, Wash.

Mike was a master mechanic
but new on a paper machine.
He looked like a walking repair shop —
full of tools, if you know what we mean.
Working one day on the wet end
it happened — just what you'd expect.
His pliers slipped out of his pocket
and, surely, the wire was wrecked.
The super was mad, and with reason.
the discipline? Not much — well, maybe:
Mike works now one tool at a time
and wearing no more than a baby.

When trained crews treat a wire with the care it deserves, Cheney Bigelow Wires deliver all the fine service you've come to expect of them. For we're keeping quality *high* by keeping our skilled craftsmen *on*. In the midst of large-scale production of war goods, Cheney Bigelow continues to develop and produce Fourdrinier wires and other mill equipment, *with full government approval;* for paper, too, is a weapon.

CHENEY BIGELOW

Fourdrinier Wires • • Dandys • • Cylinders • • Wire Cloth

CHENEY BIGELOW WIRE WORKS · 417 LIBERTY STREET · SPRINGFIELD, MASS.

products which are under their direction. This order forbids the manufacture of certain paper products and restricts the tonnage which may be used in certain others. Cartons, another tremendous pulp-consuming item, are also on the critical list. According to an announcement of September 6, a new order covering fibre containers is to be issued soon. This order, it is announced, will not be a flat prohibition against the use of fibre containers for shipping except in cases where it is practical to package products in less critical materials. Instead, the order will probably provide a percentage restriction in the tonnage of fibre containers which a person may use. This will leave each user free to package in larger units, to eliminate over-packaging, or to reduce the number of units packaged in any way he may determine.

Fibre containers under this order will probably include all solid fibreboard of .060 and over and will include all corrugated board, whether flat, in rolls, or in made-up cartons.

"It is anticipated that large savings in container materials can be made through the elimination of over-packaging — the use of a box designed to carry 65 pounds where one designed to carry 40 pounds will serve. Also, many users can economize by having containers in which they ship their products returned for re-use and by re-using containers received from establishments from which they purchase raw materials or semi-processed materials.

No container should be allowed to be destroyed. Have containers opened carefully, cleaned and folded flat for re-use wherever possible. When they have been re-used the maximum number of times, see that they get into the waste pile for sale in their special wastepaper grade.

"Fibre and corrugated containers continue under a preference-rating order although they are still available in limited quantities, and in certain sections, for non-rated orders.

"Folding and set-up boxes, manufacturing specifications of which are controlled by Order M-239, are not under priorities. They continue to be available, but, as with all pulp-consuming items, waste and extravagant use must be eliminated. Also, remember that special inventory provisions apply to virtually all of these scarce materials.

"Manpower is the last of the shortages on my list for discussion tonight. Also, it is the most serious of all our shortages since it is responsible for the critical situation in pulpwood and woodpulp, in paper.

F. W. Lodding Dead

Frederick W. Lodding, president of the Lodding Engineering Corporation, Wooster, Mass., died September 16 at his home, 24 Terrace drive at the age of 53. He was born in Oslo, Norway and, after a technical education came to this country where he has always been engaged in engineering work.

He was formerly chief engineer of Rice, Barton Corporation and in 1929 established his own firm. He is survived by his widow and W. C. Lodding, a son associated with him in business and now an ensign in the Navy.

For two years past, Mr. Lodding has had a serious heart ailment which had confined him to his home.

The Lodding Engineering Corporation, while continuing to manufacture doctors, are mainly engaged in war work.

Joins L.N.A. Staff

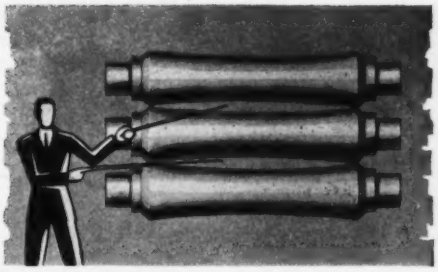
Edward D. Morris joined the staff of the Lithographers National Association here in New York the latter part of August. He fills the vacancy caused by the resignation a year ago of Stanley C. White to accept a lieutenant's commission in the U. S. Navy.

Mr. Morris was formerly with the John Bornman & Son Company of Detroit, Mich., and brings with him fifteen years of graphic arts industry, management experience. Prior to 1928 he was with Ernst and Ernst and the National Cash Register Company. He is a mid-western man — born, raised and educated in Wisconsin and a graduate of the University of Wisconsin, Madison, Wisconsin, in 1924. With the help of Mr. Morris, L.N.A. is getting a running start on its fall service program.

Box Men to Meet

Walter P. Miller, Jr., president, National Paper Box Manufacturers Association, Philadelphia, announces that the association will hold a war conference for the membership at The Drake, in Chicago, latter part of next May.

The setup paper box industry in the United States consists of approximately 900 commercial plants, doing an annual business slightly in excess of $100,000,000. The paper box business is one of the 35 recognized essential industries selected by the War Manpower Commission and is so recognized by the draft boards and WMC offices.

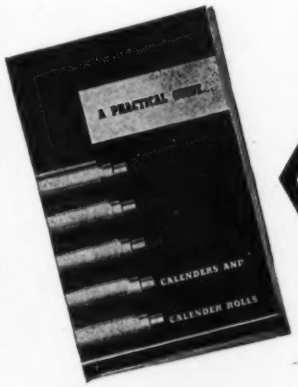


What happens to CALENDER STACK ROLLS when bearings overheat ?

Answer: "When a bearing in a calender stack generates an abnormal amount of heat, the heat flows into the end of the roll, causing expansion of that end. Unless the roll has sufficient crown to compensate for the expansion, adjacent rolls will ride on the ends, leaving the center open and making a reel of paper soft on the ends and hard in the center."

This is just one of the many causes of calender stack failure discussed in the new 32-page booklet "A PRACTICAL GUIDE TO CARE OF CALENDERS AND CALENDER ROLLS" (page 15). The booklet tells how to recognize first signs of trouble . . . describes common-sense precautions and accepted cures . . . gives many helpful hints on roll grinding . . . and outlines proper lubrication procedures. Contains no advertising.

WRITE TODAY FOR FREE COPY. Every superintendent, maintenance man and roll grinder operator should have his own copy. To get yours, simply fill out the coupon and drop it in the mail. There's no charge and no obligation.



FARREL-BIRMINGHAM CO., Inc.
ANSONIA, CONN. - Dept. 11A

Please send me a copy of your new booklet on the care of calenders and calender rolls.

Name.....
Title.....
Company.....
Address.....
City..... State.....

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONN.

Waste Material Men to Meet

The Western Division of the National Association of Waste Material Dealers Inc., of which Arthur U. Claghorn of the Pioneer Paper Stock Company is chairman and Morton A. Friedman is secretary, has scheduled a meeting of that Division for Tuesday evening, October 12. The meeting will be held in the American Room of the LaSalle Hotel, Chicago, and will be preceded by an informal dinner.

The meeting will be open to members and non-members of the association and reservations should be made through the secretary, Morton A. Friedman, P.O. Box 27, Hammond, Ind.

While an opportunity will be offered for the discussion of any subjects which are of interest to those attending, the main subject for consideration will be Post-War Problems and how they should be met.

It is hoped that those outside of Metropolitan Chicago who are planning business trips to Chicago in the near future will time their visit so as to attend this sectional meeting.

*NEUTRALIZATION

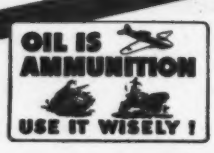
DEFINITION: The neutralization number is the weight in milligrams of the amount of potassium hydroxide (KOH) required to neutralize the acid constituents in one gram of oil.

NEUTRALIZATION TEST: Following a carefully prescribed procedure, a definite quantity of oil together with a mixture consisting of equal parts distilled water and alcohol are agitated thoroughly and heated to boiling. A phenolphthalein indicator is added and a solution of aqueous potassium hydroxide of definite strength is poured into the mixture in small increments and shaken vigorously each time. The first appearance of a sharp pink color throughout the alcohol water layer indicates the point of complete neutralization.

The number of milligrams of potassium hydroxide per gram of oil required to achieve this result is called the Neutralization Number.

SIGNIFICANCE: Corrosive mineral acids are sometimes used during the refining process of certain crudes. As a precaution against their presence in harmful proportions, it is customary to specify a maximum Neutralization Number of 0.10 for clear colored, straight mineral lubricating oils.

The Neutralization Number has no such significance in connection with unfiltered cylinder oils and black oils. These may contain larger amounts of harmless organic acids originating in the crude petroleum. High Neutralization Numbers do not imply corrosive acidity with compounded oils; i.e. mixtures of mineral oils and fatty oils. The latter oils are often inherently high in organic acidity.

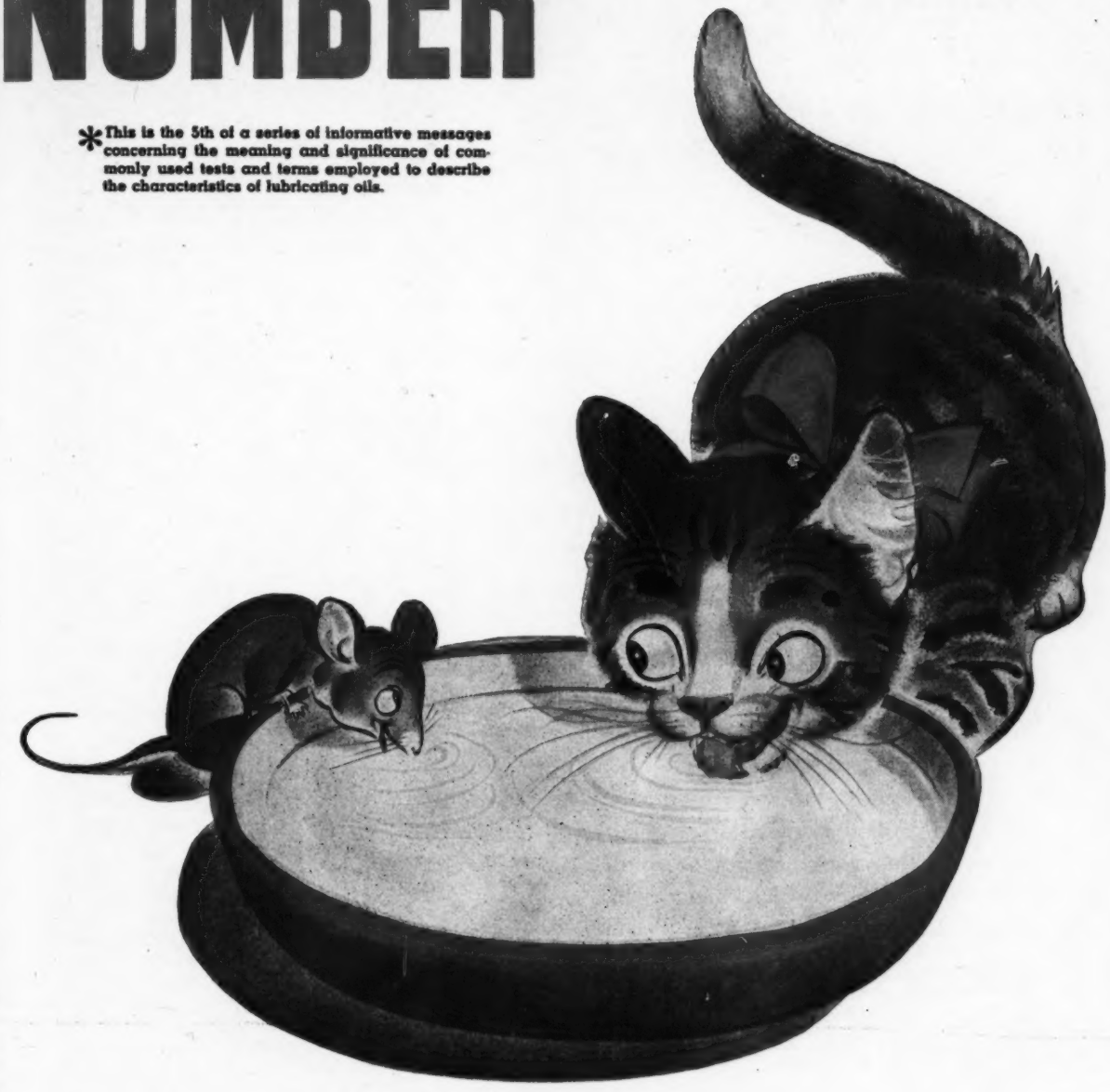


DRUMS! DRUMS! DRUMS!
War needs make it extremely important that all empty drums be returned immediately.

SCIENTIFICALLY ENGINEERED FOR EVERY INDUSTRIAL USE **TYCOL**

NUMBER

*This is the 5th of a series of informative messages concerning the meaning and significance of commonly used tests and terms employed to describe the characteristics of lubricating oils.



Tycol lubricants are manufactured in a comprehensive line so as to meet every specific operating requirement. Whether straight mineral or compounded, they are produced under rigid control to assure freedom from all harmful acidity.

Tide Water Engineers will recommend the Tycol lubricant best suited to your particular requirements.

TIDE WATER ASSOCIATED OIL COMPANY

Eastern Division: 17 Battery Place, New York 4, N. Y. • *Principal Branch Offices:* Boston, Philadelphia, Pittsburgh, Charlotte, N. C.

MAKERS OF THE FAMOUS VEEDOL MOTOR OIL

INDUSTRIAL LUBRICANTS

"—you have set up a record which is only to be broken"

—James Forrestal
Under Secretary of the Navy

Official U. S. Navy Photograph

You are talking our language, Mr. Forrestal!

We acknowledge the honor and privilege of flying the Army-Navy "E" flag. We acknowledge, too, that this recognition comes to us for work already done. We fully realize the increasing need for Warren Pumps to meet the schedules of our Navy's building program. Therefore, we accept your challenge, Mr. Forrestal, that we have set up a record and we are determined to surpass it!

WARREN STEAM PUMP COMPANY, INC.

WARREN, MASSACHUSETTS

WPB Restricts Wax Papers

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., Sept. 29, 1943 — The manufacture of waxed paper and its commercial use in wrapping, especially as an overwrap or secondary cover, was prohibited by the War Production board today under General Conservation Order M-351. Restrictions as to type and weight of paper and amount of wax will be imposed on the production and use of such paper starting today.

General Conservation Order M-351, the WPB Pulp and Paper Division pointed out, is expected to reduce the rate of general commercial use of waxed paper by about 45,000 tons of paper a year and save at the rate of 13,000 tons of petroleum or paraffin wax a year.

This conservation measure is designed to bring supply and demand into balance, it was explained, and insure adequate supplies of waxed paper for military and essential needs. Its issuance follows consultations with the Department of Agriculture, War Food Administration, Petroleum Administration for War and the WPB Chemicals Division. About 75% of U. S. waxed paper production is used for packaging food.

Household use of waxed paper in cutter boxes will not be affected by the order, nor will the manufacture and use of waxed paper be restricted to the Armed Forces, Maritime Commission, War Shipping Administration, Office of Scientific Research and Development, or in connection with lend-lease or food-export contracts.

Among the prohibited uses are double wrapping of bread, except crackers and biscuits; cereals, sugar, and salt, butter and oleomargarine, as carton overwrapping; and candy, soap and chewing gum. Bottles and canned goods may not be wrapped in waxed paper either with single or laminated sheets, under the order.

New specifications as to type and weights of paper and percentage of wax which may be manufactured and used, run from 10 to 80 pound paper, and from 10 to 80% of wax.

The requirements apply to all manufacturers, sellers and users of waxed paper, but its use is unrestricted when less than 200 pounds per month is consumed. Inventory restrictions are fixed at 90 days' supply, except that when specifically manufactured for him, a user may accept delivery if it will not increase his total supply beyond that adequate for 120 days.

Special exceptions are made to cover waxed paper in hand and paper in process of being manufactured prior to the issuance of the order but the specifications for percentages of wax must be followed.

The United States waxed paper industry is composed of about 75 manufacturers currently producing about 350,000 tons of waxed paper annually, and using approximately 255,000 tons of paper and about 95,000 tons of wax. This industry is said to be the largest single consumer of paraffin wax in the country.

The new order is a necessary implementation of Conservation Order M-241-a, which restricts the manufacture of wax paper at 110% of 1942 production.

100% for Chromium

In addition to the Army Navy E flags awarded to the Waterbury and Chicago plants of the Chromium Corporation, and recently decorated with a star on each, the Cleveland plant of this organization was awarded the coveted Army Navy E flag on September 28, making it 100% on these Awards for the Chromium Corporation.

Changes in Waste Paper

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., Sept. 29, 1943 — Changes in grade specifications, invoicing, and brokerage requirements of unsorted wastepaper have been announced by the Office of Price Administration.

Amendment No. 5 to Maximum Price Regulation No. 30 (Wastepaper), effective September 29, makes numerous alterations in grade specifications. The specifications were amended only after extensive conferences with buyers and sellers, the very great majority of whom have indicated their complete approval of the OPA action.

With minor exceptions, these changes are concerned with the presence of groundwood paper in the grades involved. Because of pulpwood shortages the use of groundwood in the production of paper has been increasing, and much new paper which was formerly free of groundwood, now contains it to a considerable extent. Because of this, available wastepaper supplies cannot as formerly, satisfy the requirements of grade definitions in the original regulation, which specify that wastepaper should be free of groundwood.

The amendment, therefore, changes the specifications to permit the inclusion of groundwood to the extent that groundwood is found in wastepaper supplies which customarily have been free of groundwood. The definition of "No. 1 Heavy Books and Magazines," now renamed "Repacked No. 1 Heavy Books and Magazines," provides specifically that the pack may contain not more than 20 per cent of magazines which contain fine groundwood.

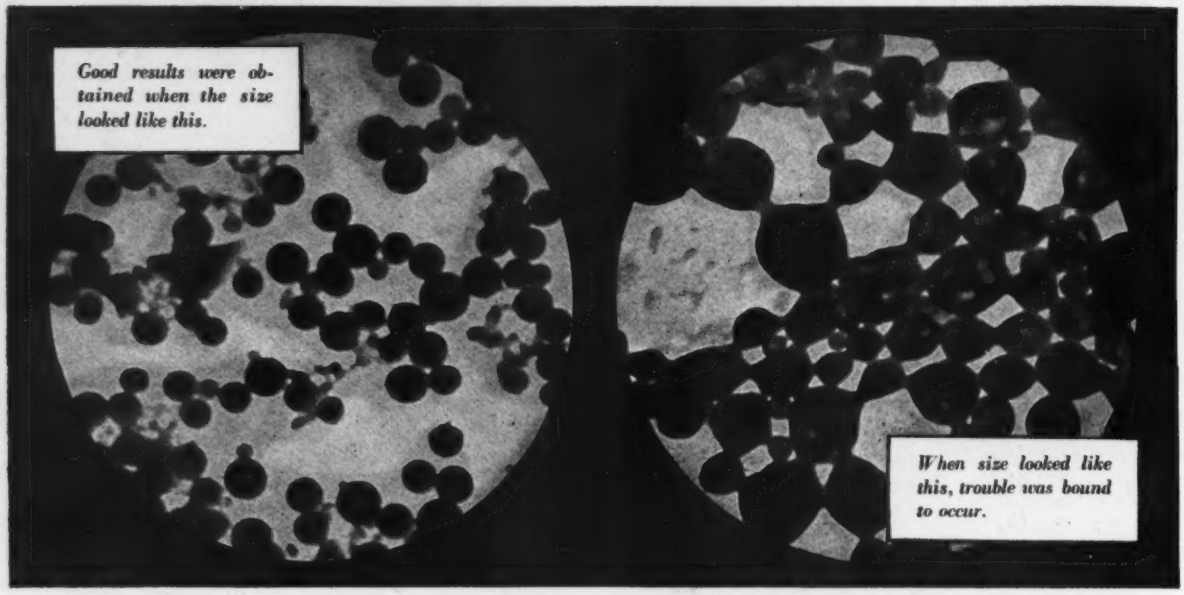
One change in specifications which does not relate to groundwood content is elimination of the grade of "Old 100% Kraft Corrugated Containers." This grade now is combined with the grade of "Old Corrugated Containers." The former grade has been eliminated because production of it has practically ceased and continued listing of the grade made it considerably more difficult for OPA to enforce requirements of the much more important price ceiling on "Old Corrugated Containers." The other changes in specifications are minor technical changes, of no substantive importance.

The amendment also amplifies the invoice requirement of the regulation in order to prevent violation of its clear intent. It formerly was not specified when delivery of the invoice must be made. In certain instances attempts were made by the trade, OPA said, to conceal illegal transactions by delaying delivery of the invoice until after the material covered by it no longer was available for inspection. Amendment No. 5 to MPR 30 now requires that the invoice be shipped as soon as the seller is able to do it.

A further change in the regulation concerns the brokerage provision, which now prohibits the charging of brokerage upon the pack of a person having close family relationship with a seller only in those cases, where, because of relationship, either party in fact exercises any control over the other. Except in those cases where the same marketing arrangements between the parties were in effect prior to price control, OPA said that generally it would not be possible to prove the absence of inter-related controls. Today's amendment now makes it possible in certain cases to demonstrate the fact of such controls.

WORK HORSES
Pumps for paper mill service must be real work horses — 24-hour-a-day service calls for the sturdiest of construction.
Ingersoll-Rand Cameron paper mill pumps are built for this kind of service and they have proved their ability in mills all over the continent.
Practically every type of pump used in the paper mill is available— a new vertical stock, horizontal stock pumps, white water pumps, liquor pumps, acid pumps, fresh water pumps, boiler-feeders—in fact, pumps for any liquid.
Ask the Ingersoll-Rand engineer for full details. Ingersoll-Rand Company, 11 Broadway, New York 4, N.Y.
Ingersoll-Rand
Cameron Pump Division
10-360

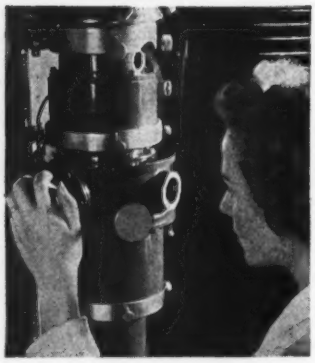
These sub-microscopic photos helped find the answer to a problem in rosin size . . . . . .



Making mountains of molehills improves papermaking chemicals

Newest in the Hercules equipment available for papermaking research, the electron microscope makes possible a new approach to papermaking problems. Submicroscopic phenomena can now be examined—for example: the penetration of pigments; the effect of cooking procedures on wood fibers; the variations in particle size and shape of clays, fillers, sizes, binders, adhesives, impregnants, inks.

The objective: to find out what makes more economical and finer chemicals for paper production —and then to supply these chemicals to you.



PAPERMAKERS CHEMICAL DEPARTMENT

HERCULES

POWDER COMPANY, INC.

WILMINGTON ★ DELAWARE

SUPERIOR PMC CHEMICALS

PM-88

Boston, Mass. Holyoke, Mass. Albany, N. Y. New York, N. Y. Atlanta, Ga. Savannah, Ga.
Jacksonville, Fla. Marrero, La. Detroit, Mich. Kalamazoo, Mich. Milwaukee, Wis. Chicago, Ill.
Portland, Ore. San Francisco, Calif. Erauman, Ont. (Hercules Powder Co., Canada, Ltd.)

THE CASE OF THE *TALKING TICKET*

COLOR serves busy conductors on commuters' trains. They can tell at a glance whether the ticket is for the current month. No time is lost in close scrutiny . . . and the chances of "non-profit" riding are reduced to a minimum.

Throughout the transportation field and in war plants and offices—whenever speed and accuracy are sought—you'll find color and paper teamed together and doing a *big* job.

Color distinctions on paper record forms, orders, job tickets, tags and labels speed manufacturing and distribution—provide quick, positive identification, lessen or eliminate errors.

Veteran employees can frequently step up their output—and new help is more easily trained—when color and paper are fully utilized.

But the dyestuffs that make paper "talk" must be selected carefully—made to work most efficiently in their million and one tasks—and applied with an eye toward conservation.

Du Pont Dyestuffs technicians can help you in this task—as well as in the job of coloring today's paper products and specialties. With their practical experience, they can help you unite dyes and paper most effectively, most economically. E. I. du Pont de Nemours & Co. (Inc.), Organic Chemicals Department, Dyestuffs Division, Wilmington, Del.

BACK THE ATTACK WITH WAR BONDS

DU PONT DYESTUFFS
REG. U.S. PAT. OFF.

DYESTUFFS

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

PAPER
TRADE JOURNAL
Title Reg. U. S. Pat. Off.
Henry J. Berger
EDITOR

Vol. 117 September 30, 1943 No. 14

COMING EVENTS IN PAPER INDUSTRY

TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY, Fall Meeting, Palmer House, Chicago, September 21-24, 1943.

NEW ENGLAND SECTION. Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Roger Smith Hotel, Holyoke, Mass.

DELAWARE VALLEY SECTION. Technical Association of the Pulp and Paper Industry—First Friday of each month at the Engineers Club, Philadelphia, Pa.

LAKE STATES SECTION. Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

KALAMAZOO VALLEY SECTION. Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park, American Hotel, Kalamazoo, Mich.

POST-WAR BUSINESS

Various studies and forecasts have been made and are being made in reference to the unshackling of business from governmental wartime regulations. Unfortunately, it seems to many business men, whose experience favors a realistic trend of thought rather than that of a mere ideal concept, too much post-war tentative planning is based upon precedent. The past furnishes highly important experiences upon which to check previous errors in judgment, but it can scarcely be followed otherwise with much hope of substantial success. Post-war planning and the rehabilitation of world industry and especially industry and trade in the United States, looms up as the greatest problem America has ever faced. The job is so vast that even the enormous demand made of American industry in the successful conduct of the war, is of even less proportion and significance for the future of America.

The most constructive thinking on the rehabilitation of American industry thus far comes from business men themselves, because their thinking is more specific. The government too, has issued some general ideas that are not very specific. To successfully solve the problem all of the major factors appear highly essential; a sound and practical government fiscal and foreign policy, and full cooperation of private industry to insure the highest attainable level of employment and re-employment. As a preliminary step of the Administration it has been suggested that it permit private enterprises to retain more of their earnings for post-war utilization. That the government give first thought to the welfare of American prosperity in any plans projected to aid destitute or greatly impoverished European nations. That plans to render substantial aid to Europe must come from increased production and equitable profits by private enterprise, not merely by raising taxes. To many minds the conclusion appears obvious, that the gigantic war effort America is making was only possible by the contribution of private enterprise, which equally includes management and labor. Government has merely dictated the effort. To attain the greatest measure of success in global rehabilitation to provide an enduring peace, the fullest cooperation of government, industry, and labor appears vital. If the government can reduce its fettering control of private industry after the war victory to a reasonable control of broad principles, management and labor can then hope to arrive at a satisfactory adjustment of any difference existing or that may arise. It may be difficult to resolve all these basic factors but a successful post-war adjustment seems to depend most largely on how well this can be accomplished. A highly commendable state of understanding and agreement has been achieved in establishing the notable record of wartime production and as much, if not more, should be accomplished to recreate global peace.

In commenting on post-war purchasing, the Chamber of Commerce of the United States, under date of September 20, states in part: "Post-war buying intentions of the nation's families are increasing almost daily and present indications are that post-war purchases will be far in excess of the billions of dollars that were in prospect last winter. Bringing a December, 1942, nation wide survey up to date, the Chamber reported that the number of families now planning to purchase one or more major articles within six months after the return of peace, has risen from 53% to 64% of the nation's total. On the other side of the ledger, 61% of the people interviewed said they are now able to save. It was 56% eight months ago. These figures include only those people who think they are saving. Actually, 84%, an increase of 3 points, are either accumulating money in a saving account or are putting it in some form of savings or investment."

This second survey of the Chamber points out "that the percentage of people buying war bonds and stamps has risen from 69 to 76. The percentage of people in the upper income groups investing as much as 10% of their income in such bonds and stamps has dropped from 28 to 23; the middle income group has slumped from 35 to 26; the lower income groups has dropped from 28 to 21. It is obvious from the Chamber's other figures that the number of persons who so invest at least 10% of their income has climbed sharply. Life insurance investments are attracting the funds of 56% of the people, compared with 58% in December. The percentage going to savings accounts has risen from 21% to 26%. But only 25% of the nation's families are saving for a specific purpose. Even so, that figure is 6 points higher than eight

months ago. Despite the evidence that many people intend to make immediate, post-war purchases, most of them are not, on the basis of present savings, counting on paying cash. "The American habit of installment buying will continue to be a major factor in large consumer purchases," said the Chamber's report, prepared by a staff headed by William J. Mill, special analyst. "Pertinent to this statement is the following data about installment buying gathered in the survey: 52% (it was 58% last December) say they have used the time-payment plan to buy articles which they own: 15%, compared with 28% in December, are still making payments for such purposes."

To Direct Naval Stores Dept.

Hercules Powder Company announced today the appointment of G. Fred Hogg as sales director of its naval stores department. Mr. Hogg, who was formerly manager of the Naval Stores Department office in Chicago, has spent the past year at the chemical company's industrial explosives plant in Hercules, Calif., where he served as technical assistant superintendent and chairman of the plant's War Manpower Committee.

The new sales director for Hercules pine chemical products joined the company in 1929 as a chemist at the Kenvil, N. J., laboratory, after having received his M.S. in chemical engineering from the University of Michigan.

In 1930, he joined the Naval Stores Department as a sales and service representative. In 1935, he was transferred to the Chicago Naval Stores office, and was appointed manager in February, 1936.

Production Ratio Report*

(Production as per cent of six-day capacity)

COMPARATIVE WEEKLY SUMMARIES

Current Weeks—1943		Corresponding Weeks—1942	
August 14	92.5	August 15	77.5
August 21	91.1	August 22	81.2
August 28	91.5	August 29	83.3
September 4	91.4	September 5	83.3
September 11	75.7	September 12	70.3
(Holiday September 6)			
September 18	92.4	September 19	85.2

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July
1942	104.5	103.9	102.9	100.4	95.3	87.4	75.8
1943	87.2	88.9	89.5	88.7	91.5	86.5	84.4

Year	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1942	80.8	82.8	90.6	86.9	80.1	90.4
1943	91.3	....	....	....	....	....

COMPARATIVE YEARLY SUMMARIES

	1936	1937	1938	1939	1940	1941	1942	1943
Year to Date ...	78.1	86.3	69.1	79.1	86.2	94.7	92.4	88.3
Year Average ...	80.4	79.8	71.5	83.4	85.6	97.4	90.4	....

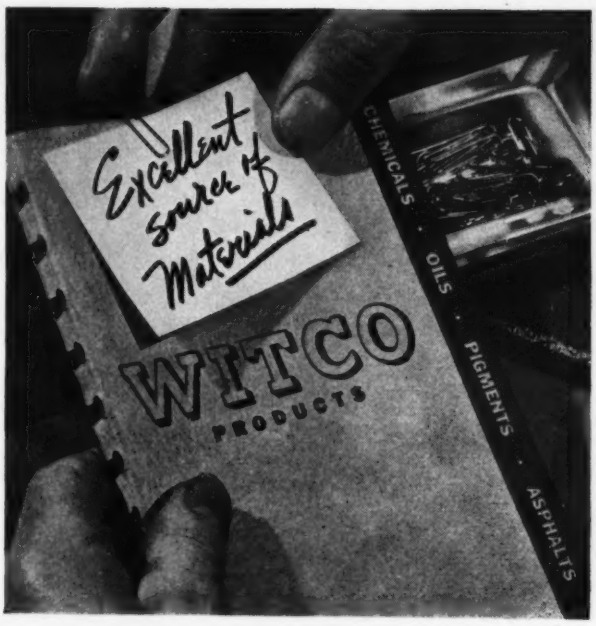
*Based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

PAPERBOARD OPERATING RATIOS †

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1937	83	89	89	91	88	80	69	77	72	70	57	47	75
1938	56	63	63	60	60	59	59	60	70	73	67	61	64
1939	65	73	76	74	69	73	68	77	82	91	88	77	77
1940	78	75	74	76	82	85	77	79	78	85	82	77	78
1941	81	88	89	89	91	94	92	98	95	99	98	90	92
1942	102	101	101	95	82	72	68	75	76	81	82	77	84
1943	86	88	94	94	96	94	89	96	..	..	..	..	..

Week ending Aug. 14, 1943—98 Week ending Sept. 4, 1943—97
Week ending Aug. 21, 1943—95 Week ending Sept. 11, 1943—83
Week ending Aug. 28, 1943—96 Week ending Sept. 18, 1943—98

†Per cents of operation based on "Inch-Hours" reported to the National Paperboard Assn.



FOR EXAMPLE—WITCO CARBON BLACK NO. 11

Typical of the many timely and effective materials developed by Wishnick-Tumpeer, Inc., to meet today's needs is WITCO CARBON BLACK NO. 11, especially produced for use in paper. It is a pellet-type black and is more economical, cleaner, and more easily incorporated into the beater and dispersed throughout the pulp than the uncompressed blacks generally used in paper making. Our staff will gladly cooperate with you in getting the most benefit from WITCO CARBON BLACK NO. 11. Write for samples and more complete information.

WISHNICK-TUMPEER, INC.

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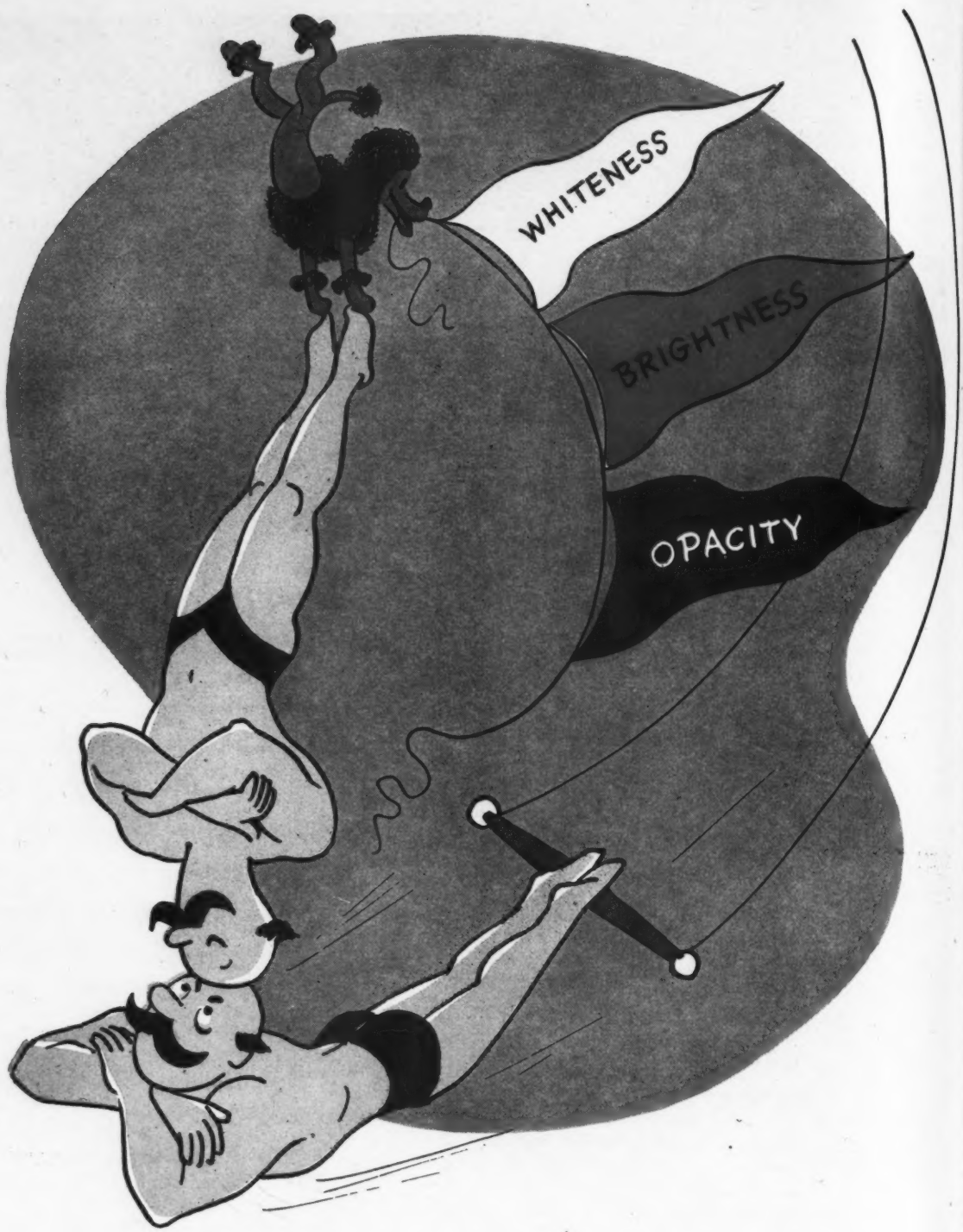

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The Nature of Lignosulphonic Acids Fractionated by Chemical and Physical Methods*

By W. Allan Schenck[1]

Abstract

After a critical discussion of the sulphonation of lignin in the sulphite cooking process on the basis of Freudenberg's structural formula for lignin, experiments are described which had as their goal the fractionation of lignosulphonic acids from two widely different cooks by chemical and physical methods. These fractions were further investigated in order to determine whether the lignin is sulphonated by the entrance of several sulphonic acid groups into the lignin molecule without degradation of the latter, or whether the lignin molecule is broken into smaller fragments each having one sulphonic acid group. Because of the impossibility of obtaining suitable equipment due to the present emergency, the final goal was not reached. The results so far obtained, however, indicate that a breakdown of the lignin molecule into smaller sulphonated fragments takes place.

When wood is treated with bisulphite solutions, the lignin is sulphonated and eventually dissolved. In the production of sulphite pulp by this reaction, the excess of sulphur dioxide is recovered but the sulphur combined with the lignin is lost. The amount of this loss depends chiefly upon the degree of sulphonation of the lignin which, in turn, is related to cooking conditions. The lowest sulphur content of lignosulphonic acid necessary to render the lignin soluble in water is about 3.5%, which corresponds to one sulphonic acid group for a lignin building unit with a molecular weight of 840 or for five lignin building stones with the basic C_6-C_3 skeleton. The sulphur contents of lignosulphonic acids from commercial waste liquors and from experimental cooks reported in the literature usually vary from 5-7%, although values as high as 10-11% have been reported (*1*). The question arises as to

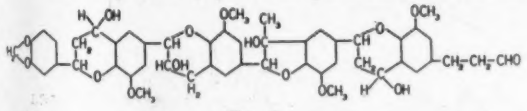

FIG. 1
Structural Formula of Lignin Based on Freudenberg's Concept

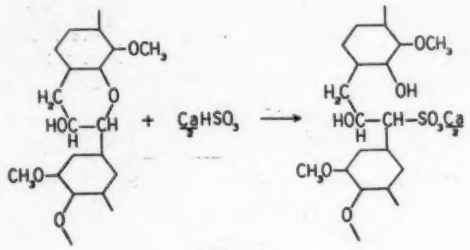

FIG. 2
Opening of a Pyran Ring

how the higher sulphonation of lignin occurs. Does the lignin building unit react with a second molecule of sulphite to give a lignodisulphonic acid, or is the lignin molecule split into smaller fractions, each having one sulphonic acid group; if the latter occurs, is the chemical nature changed in a way that can be detected? This may be explained by the lignin building unit based on Freudenberg's structural formula, consisting of five C_6-C_3 lignin building stones, combined by pyran or furan rings and ether linkages (Fig. 1) (*2*).[2]

This lignin building unit agrees with the following experimental results: the formation of about 2.5% of formaldehyde [originating from the methylene oxide ring (*2*) (left end of Fig. 1)][3], the formation of 6% of acetic acid on oxidation with chromic acid (originating from the CH_3-C group), the presence of four methoxyl and four nonphenolic hydroxyl groups, the presence of a carbonyl group[4] which allows the formation of acetal ethers (e.g., methanol or butanol lignins; these are hydrolyzed by strong mineral acids). This formula does not agree with the presence of a phenolic hydroxyl group, the existence of which is proved by the fact that the acetal ethers are soluble in dilute alkali and are recovered by precipitation with carbon dioxide and that, upon methylation with diazomethane in an anhydrous solvent (such as dioxane), a second hydroxyl group is methylated in addition to the enolized carbonyl group.

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A portion of a thesis submitted in partial fulfillment of the requirements of The Institute of Paper Chemistry for the degree of Doctor of Philosophy from Lawrence College, Appleton, Wis., June, 1942. This work was carried out under the direction of F. E. Brauns and M. A. Buchanan.

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[2]A similar formula, however, with some syringyl groups present has been used by Ericson [*Svensk Papperstidn.* 46:93 (1943)] for aspen lignin.

[3]In a recent paper Freudenberg and Plankenhorn [*Ber.* 75:857-867 (1942)] concluded that the formation of formaldehyde from lignin on distillation with 12% hydrochloric acid is not the result of the presence of a methylene oxide ring but originates from other groups in lignin, because it was found in model experiments that *p*-hydroxymesityl alcohol and *β*-hydroxypropioveratrone give formaldehyde when distilled with 12% hydrochloric acid or 28% sulphuric acid. The nature of the substituent in the methylene oxide ring which is necessary to produce this result is unknown at present.

[4]Freudenberg and Plankenhorn [*Ber.* 75:857-867 (1942)] have reported that, working with acetic acid lignin, an oxime is obtained containing nitrogen in an amount which corresponds to one carbonyl group per five lignin building stones.

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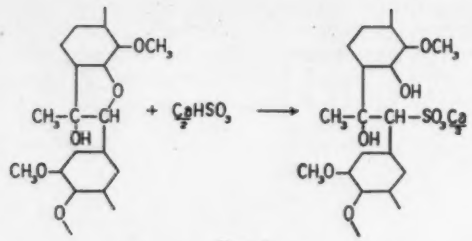

FIG. 3
Opening of a Furan Ring

According to Freudenberg (*3*) the sulphonation of lignin takes place by the opening of a pyran (Fig. 2) or furan (Fig. 3) ring at the oxygen bridge. If such a reaction takes place, a new phenolic hydroxyl group would be formed for each sulphonyl group introduced and the latter would be combined to a carbon atom of the side chain. Such a lignosulphonic acid would have one sulphonic acid group in the lignin building unit, which would correspond to about 3.5% sulphur. As there may be four such pyran or furan rings present in lignin, this reaction could take place four times and the final product would be a lignotetrasulphonic acid with the structure indicated in Fig. 4. Such a

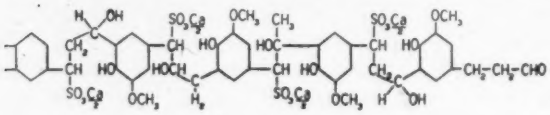

FIG. 4
Calcium Lignotetrasulphonate Obtained by Sulphonation of Lignin

compound would have 10.6% of sulphur; this is the highest attainable sulphur content, if one disregards the possibility that a sulphite group can add to the carbonyl group as so-called loosely combined sulphurous acid. If such a reaction occurs in the sulphonation of lignin, then, for each sulphonic acid group entering the lignin building unit, a new phenolic hydroxyl group should be formed. The detection of these phenolic hydroxyl groups would be one way to support this theory.

In contradiction to this theory is the fact that sprucewood, which has been methylated with diazomethane to the extent that the methoxyl content of the lignin is 21.5% (equal to six methoxyl groups per lignin building unit), can no longer be delignified by the sulphite process (*4*). It is difficult to understand why two methylated hydroxyl groups should prevent the opening of a pyran or furan ring. At this point, attention may be drawn to a contradiction in the literature. Freudenberg (*5*) has stated that there are no phenolic hydroxyl groups present in lignin.[5] According to Freudenberg (*6*) and Hägglund (*7*), the number of hydroxyl groups in the lignosulphonic acid is the same as in the original lignin. This has been confirmed experimentally by King, Brauns, and Hibbert (*8*). From this fact the conclusion is drawn by Freudenberg (*9*) that the sulphonic acid group must enter the benzene nucleus. On the other hand, Freudenberg (*10*) has found that, on sulphonation of lignin, a new phenolic hydroxyl group is formed for each sulphonic acid group introduced. According to the Freudenberg school (*11*), the reaction of thioglycolic acid with lignin and the formation of alkali lignin in the soda cooking process also involve the opening of a pyran or furan ring, with the formation of a phenolic hydroxyl group. It is further interesting to note that the Freudenberg school (*11*) assumes the presence of simple ether linkages connecting lignin building stones, which are split on sulphonation, with a reduction in the size of the molecule as shown in Fig. 5. Simple ether linkages in lignin have been assumed by several investigators and structural formulas with oxygen bridges have been proposed (*12*), but their presence has been challenged because such linkages should be split upon heating with hydriodic acid. It has been shown recently (*13*) that methylated sprucewood cannot be pulped by the soda process. If it is true that, in this process, a furan or pyran ring is opened with the formation of a new phenolic hydroxyl goup, it is not clear why this reaction does not occur with methylated sprucewood.

The question whether, in the sulphite cooking process, the lignin is sulphonated without degradation of the lignin molecule (Fig. 4), or the lignin molecule is split into smaller fragments (according to Fig. 5), is not only of great importance in the sulphite industry

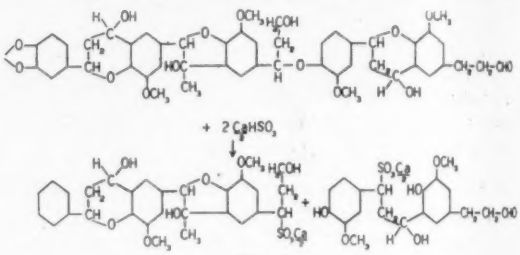

FIG. 5
Sulphonation of Lignin by Fission of an Ether Linkage and Degradation of the Lignin Molecule

from the standpoint of sulphur consumption but also in the utilization of the sulphite waste liquor. It is known that, the higher the degree of sulphonation of lignin, the more difficult is the isolation of the lignosulphonate by precipitation; on the other hand, a highly sulphonated lignosulphonic acid gives a higher yield of vanillin (*14*). It has already been mentioned that, in order to obtain a solution of lignin, a sulphur content of at least 3.5% is necessary; however, the actual consumption of sulphur in the mill is much higher. Mitchell and Yorston (*15*) expressed the practical need for more information on this subject, when they stated that: "While there is evidence that the consumption of sulphur [in sulphite pulping] is greater than it need be, not enough is known of the reactions in which the excess sulphur takes part to enable any methods of reducing that consumption to be suggested."

It was the objective of this investigation to devise a scheme of fractionation and purification of lignosulphonic acid salts based on chemical and physical methods which, when applied to two sulphite waste liquors prepared by widely different cooking conditions, would yield fundamental information concerning the degree of sulphonation of the lignin. At the time it was hoped that data could be obtained which would permit conclusions as to whether a degradation of the lignin molecule takes place, or whether polysulphonated lignosulphonic acids are formed without splitting of the lignin molecule. In the latter case, only a lignomonosulphonic acid (that having the lowest possible sulphur content) or a lignotetrasulphonic acid (that having the highest possible sulphur con-

[5] A recent paper by Freudenberg and Walch [*Ber.* 76:305-308 (1943)] makes the statement that spruce lignin contains one phenolic hydroxyl group for each five or six lignin building stones.

tent) would be obtained in a relatively pure state; any di- or trisulphonic acid formed would be present as mixtures of such composition that they would analyze as a uniform lignosulphonic acid. The final goal was not reached, because of difficulties caused in part by the physical and chemical properties of the lignosulphonic acids under investigation and in part by the present emergency, which made it impossible to obtain suitable equipment. Because there is no chance of continuing the work for the duration, the results of this investigation are reported.

Cooking Conditions

In order to obtain sulphite waste liquors of widely different properties, two laboratory sulphite cooks were carried out under the conditions indicated in Table I.

TABLE I—COOKING CONDITIONS

	Cook I	Cook II
CaO, %	1.0	1.0
Combined SO_2, %	1.14	1.14
Total SO_2 %	4.5	5.5
Maximum temperature, °C.	125	140
Time to maximum, hr.	3	4
Time at maximum, hr.	5	5.5
Liquor : wood ratio	8:1	8:1

Black sprucewood from a freshly cut tree was reduced to sawdust and extracted first with 95% ethanol and then in a Soxhlet apparatus with a 2:1 alcohol-benzene mixture. It was washed twice with ethanol, twice with water, and air dried to a moisture content of about 10%. Cook I was carried out in a stationary stainless-steel autoclave having a capacity of 5,500 ml., and Cook II in a 25-liter horizontal rotary stainless-steel digester. The waste liquors were separated from the pulps by filtration, the latter being washed with water containing some sulphurous acid. The waste liquors and their corresponding wash waters were combined and concentrated under reduced pressure to about 1,500 ml. With the removal of the free sulphurous acid, calcium sulphite and calcium sulphate separated and were filtered from time to time. Whereas the sulphite waste liquor from Cook I had the normal light brown color, that from Cook II was almost black. The latter had a slight odor of a burnt cook because of the drastic cooking conditions employed. The concentrations under reduced pressure and all other distillation *in vacuo* were carried out in a nitrogen atmosphere to avoid any oxidation of the lignosulphonic acid. From the lignin content of the original wood and that of the pulp, it was calculated that 262 grams (65%) of the lignin were dissolved in Cook I and 398 grams (98.9%) in Cook II. Both concentrates were made up to 2,000 ml. and analyzed; the results are shown in Table II.

TABLE II—ANALYSES OF LIGNOSULPHONIC ACIDS

	Cook I	Cook II
Density	1.146	1.197
Solids by weight, %	31.9	41
MeO of the solid, %	5.9	7.5
Ash, %	18.3	4.7

Separation of Lignosulphonic Acids

In order to separate the lignosulphonic acids from the principal amount of carbohydrate material, the two concentrated solutions were treated with a slurry of lime with vigorous stirring, heavy preciptates being formed in each case. The precipitates were filtered and washed three times by suspending them in water, allowing the mixtures to stand for 20-24 hours, and filtering; the basic calcium lignosulphonates (IA and IIA) had a canary-yellow and a dark brown color, respectively. The filtrates and their corresponding wash waters were combined, acidified with sulphurous acid, and concentrated, giving the calcium hydroxide-soluble fractions, I-sol. and II-sol. To recover the calcium lignosulphonates, IA and IIA were suspended in water and sulphur dioxide was passed into the suspension until a pH of 2 was reached; this caused the precipitation of calcium sulphite, while the calcium lignosulphonates went into solution. The filtered solutions were concentrated *in vacuo*, and the precipitation with lime was repeated with both products. The filtrates were added to I-sol. and II-sol., respectively. The basic calcium lignosulphonates were decomposed again with sulphurous acid, and the solutions were concentrated and dialyzed through a Visking membrane toward distilled water containing 3-4% sulphurous acid.

The dialyzed calcium salt solutions were concentrated, and the product from I was isolated by dropping its solution in aqueous methanol into glacial acetic acid and that from II by adding its aqueous solution to dioxane. After two such precipitations, IA-1 was obtained as a light gray powder and IIA-1 as a brown product. IA-1 was reprecipitated from its aqueous methanol solution into dioxane. These products were analyzed with the results shown in Table III.

The dialyzates (ID and IID) were concentrated *in vacuo*. The concentrated ID, from which calcium sulphite separated, was filtered and then added to a large volume of absolute methanol; a white precipitate was obtained. After one precipitation into glacial acetic acid and two further precipitations into absolute methanol, this product (ID-1) was analyzed (Table III). Product IID was not further investigated because of lack of time.

TABLE III—ANALYSES OF LIGNOSULPHONIC ACID FRACTIONS

Designation of Lignosulphonic Acid Fraction	Methoxyl %	Sulphur %	Ash %	Sulphur Calculated on the Ash-Free Basis*	Methoxyl Calculated on the SO_3 and Ash-Free Basis**	Behavior on Dialysis
IA-1	13.6	4.9	1.65	4.95	15.5	Retained
IIA-1	11.1	5.4	8.2	5.5	13.2	Retained
ID-1	9.8	8.4	14.2	8.8	13.1	Passed
IB-1	10.4	7.5	17.5	7.8	13.6	Retained
IIB-1	9.5	10.0	19.5	10.6	13.1	Retained
IB-2	12.8	5.9	2.7	6.0	15.4	
IIB-2	12.5	9.1	2.3	9.25	16.5	

* Ash Ignition factor=$Ca/CaSo_4$.
** [% CH_3O (as determined) x 100]/[100—%S x (SO_3/S)—ash x $Ca/CaSO_4$].

The solutions (I-sol. and II-sol.) containing the calcium hydroxide-soluble fractions were acidified with sulphurous acid and concentrated under reduced pressure. After filtration of the calcium sulphite, the solutions IB and IIB were made up to 1,000 ml.

A portion of each solution was dialyzed until the dialyzate did not leave any residue; the dialyzed solutions were evaporated to dryness, giving the residues IB-1 and IIB-1, which were analyzed (Table III).

The major portion of I-sol. and II-sol. was treated with a solution of neutral lead acetate for removal of the sulphite and sulphate ions. The precipitates were filtered, washed, and discarded. The dark-colored filtrates were treated with basic lead acetate until further addition did not cause the formation of a precipitate. The precipitates, which were pale yellow in the case of I-sol. and light brown in the case of II-sol., were filtered, thoroughly washed, and decomposed by passing sulphur dioxide into their aqueous suspensions until a pH of 2-3 was reached; this caused the dissolution of the lignosulphonic acid salt. A portion

of the filtrates from the lead preciptates was evaporated to dryness; the low methoxyl content (calculated on the ash-free basis) indicated that only a minute amount of lignin material was left in the filtrates, which were therefore discarded. The solutions of the regenerated lignosulphonic acid salts were concentrated *in vacuo*. The salt IB-2 from I-sol. was isolated and purified by three precipitations of its aqueous methanol solution into glacial acetic acid and five precipitations into dioxane. The salt IIB-2 from II-sol. was purified by two precipitations into glacial acetic acid and two precipitations into dioxane. These products were also analyzed (Table III).

Discussion

As outlined in the introduction, the lowest sulphur content necessary for the dissolution of a lignosulphonic acid is 3.5%, which corresponds to one sulphonic acid group per lignin building unit of five lignin building stones. Any higher sulphonation is the result either of the entrance of two or more sulphonic acid groups into the lignin building unit or of the degradation of the lignin building unit into smaller fragments consisting of one to four lignin building stones. The sulphur content for fragments having one sulphonic acid group is calculated to be about 12.9% for one lignin building stone, 7.7% for two, 5.5% for three, and 4.25% for four building stones. Assuming that a splitting of the lignin building unit into smaller fragments (Fig. 5) can occur, a lignosulphonic acid with 6.4% sulphur content may consist of (*a*) a pure lignonsulphonic acid (according to the scheme in Fig. 4) with two SO_3H groups; (*b*) a mixture of two or more differently sulphonated lignosulphonic acids obtained without splitting of the lignin molecule as shown in Fig. 4; (*c*) a mixture of sulphonated fragments of different sizes as shown in Fig. 5; or (*d*) a mixture of *b* and *c*. If the sulphonation takes place according to Fig. 4, the size of the molecule will increase with increasing degree of sulphonation; on the other hand, when the lignin is degraded, the size of the molecule of the lignosulphonic acid will become smaller in spite of the entrance of sulphonic acid groups and, consequently, will pass through the dialyzing membrane. Table III shows that the lignosulphonic acids of the two cooks having the lowest sulphur content (IA-1 and IIA-1) are those which are precipitated by lime and are retained in the dialyzer, and may be a mixture of lignomono- and disulphonic acids. The lignosulphonic acid which passed the membrane (ID) had a sulphur content of 8.8%. Unless the lignosulphonic acid obtained by higher sulphonation (according to the structure shown in Fig. 4) is likewise more ionized and approaches more and more a true solution with increasing sulphonation, the passage through the membrane can be explained only by the fact that the lignin is degraded and that small sulphonated fragments are formed which pass through the membrane. The lignosulphonic acids not precipitated by lime and not passing through the membrane (IB-1 and IIB-1) have high sulphur contents and may be mixtures of tri- and tetrasulphonic acids (Fig. 4). Why they are not precipitated by lime cannot be decided without further investigation. The lignosulphonic acids not precipitated by lime but precipitated by basic lead acetate (IB-2 and IIB-2) have higher sulphur contents than the corresponding lignosulphonic acid precipitated by lime, but they do not pass through the membrane. On the other hand, IB-2 and IIB-2 have lower sulphur contents than the lignosulphonic acids (IB-1 and IIB-1) which are not precipitated by lime but are retained by the membrane. Because IB-1 and IIB-1 are isolated by dialysis of the filtrate obtained from the lime-water precipitate, whereas IB-2 and IIB-2 are precipitated from the same filtrate by basic lead acetate, it is obvious that a portion of the IB-2 and IIB-2 fractions must have passed through the membrane during the dialysis. IB-2 and IIB-2 must, therefore, have a lower molecular size than IB-1 and IIB-1 with their higher sulphur content. From this, it must be concluded that IB-2 and IIB-2 may be lignosulphonic acids of sulphonated lignin fragments.[6]

It should be emphasized that this was an attempt to attack the problem outlined above. Certain results have been obtained, but much remains to be done. For instance, the isolation and further purification are not satisfactory. The precipitation (e.g., of the lignosulphonates into glacial acetic acid) is unsatisfactory because it apparently gives some free lignosulphonic acid, as indicated by the low ash content (IA-1, IB-2, and IIB-2) in comparison with the sulphur content. This is further shown by the fact that, on drying, the products become partially insoluble in water; this may also account for the high methoxyl content of the products after their precipitation into methanol. This work will be continued as time permits.

[6]In a recent paper dealing with molecular weight determinations of lignosulphonic acid fractions, Schwabe and Hasner [*Cellulosechem.* 20:61-72 (1942)] found molecular weights ranging between 300-400 and 20,000.

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The Chemistry of Large Molecules

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Acclimatization of Bacteria to Disinfectants Used in the Paper and Paperboard Industry*

By John W. Appling[1] and B. F. Shema[2]

Abstract

A general discussion of acclimatization of living organisms to injurious substances has been given as an introduction to some extensive experimental work on the acclimatization of Aerobacter aerogenes *to the disinfectant sodium pentachlorophenate. This organism was selected because of the frequency of its occurrence in slime. It has been trained or acclimated to grow on concentrations of sodium pentachlorophenate which are usually lethal for it—e.g., in two cases the organism grew on 0.230% of Santobrite (sodium pentachlorophenate). This concentration was 9.2 times the maximum concentration on which it grew prior to acclimatization. Striking increases in cell length were observed as the organism became acclimated. Not infrequently there were cells which were 25 times the normal length. It was also discovered that the test organism did not maintain its resistance unless it was grown on a nutrient medium which contained the disinfecant. These results suggest: (a) that some bacteria may become sufficiently acclimated to a given disinfectant so that the latter becomes ineffective and (b) that continuous exposure to the disinfectant is necessary in order to maintain the acclimatization acquired.*

Bacteriological control in paper and board mills can usually be accomplished by the application of good housekeeping methods and/or by the judicious use of chemical disinfectants. In the paper and board industry, the mills which make milk container stock have pioneered in the field of bacteriological control. As a result, these mills have no slime problem and they probably have no bacterial degradation of woolen felts; however, some of them have occasionally experienced unsatisfactory bacteriological control. This has manifested itself in the production of board which failed to conform either to the specifications of the American Public Health Association *(1)* and/or to those of the U. S. Milk Ordinance and Code *(2)*. It has been suggested that the reason for this might be found in the acclimatization of bacteria to the disinfectant being used. This has been referred to by some technical workers as immunization; however, this term has an entirely different connotation. Immunization refers to the development of resistance by animals to pathogenic organisms, whereas acclimatization refers to the adaptation, through increased resistance, of living organisms to new environmental conditions. In the present case, acclimatization of bacteria to a specific disinfectant might account for an initial period of satisfactory bacteriological control, during which some of the bacteria developed a marked resistance to the disinfectant. In other words, the presence of a more resistant microflora is specifically implied when the term acclimatization is used.

The term immunization has been mentioned as an example of resistance by animals to pathogenic organisms. A few examples should suffice to clarify this concept and to distinguish it from acclimatization. Whooping cough is a terrible disease of early childhood. The mortality among children under two years is very high, probably higher than that of any other disease to which young children are subject. The causal organism of whooping cough is a bacterium known as *Hemophilus pertussis*. An extremely successful immunization against whooping cough can be produced by means of a vaccine which is given to the susceptible child. In reality, the child becomes immunized because of his reaction to the vaccine which contains millions of dead cells of *H. pertussis*. This reaction is much less than that produced when living cells of this bacterium enter the body; however, the result is the same—namely, resistance to living cells is *acquired* and this is known as immunity to whooping cough. There are many examples of immunization; some are of short duration, whereas others are of very long duration. Some persons claim successful immunization to the common cold, but they must immunize themselves every winter in order to obtain results. Immunization to typhoid fever usually lasts for several years, and immunization to small pox often lasts for life. The examples used refer to immunization in man; however, there are many examples of immunization in domestic animals. In every case, the immunization is an increased resistance, acquired by the animal, against pathogenic organisms.

Acclimatization, on the other hand, is the adaptation of living organisms to new environmental conditions. Originally, the term was limited to climatic conditions and to animals—particularly, man. Biologists now apply the term in a much wider sense, since any living organism, plant, or animal may be capable of adapting itself to new environmental conditions. The latter may be physical or chemical in nature; because the adaptation under discussion is to chemical disinfectants, no further reference will be made to adaptation to physical changes in environment. At least three types of chemical acclimatization are recognized by Heilbrunn *(3)*: *(a)* acclimatization of aerobic organisms to low oxygen concentrations, *(b)* osmotic pressure acclimatization (which may also be regarded as physical acclimatization), and *(c)* acclimatization to injurious substances or poisons. According to Heilbrunn, "One of the most striking and, from the standpoint of continuance of life on this planet, one of the most important aspects of acclimatization is the capacity of living systems to adjust themselves to the presence of poisonous substances. Acclimatization to poisons occurs in all living organisms from bacteria to men."

It is definitely known that some human diseases such as syphilis, malaria, and African sleeping sick-

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* Presented at the Army and Navy Requirements Conference of the Technical Association of the Pulp and Paper Industry, Palmer House, Chicago, Ill., Sept. 21-24, 1943.

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ness are often difficult to cure because of the power of acclimatization which is possessed by the causal microorganisms. The causal organism of syphilis will become acclimated to organic compounds of arsenic during the treatment of some patients, and recourse must be made to other chemical disinfectants to which the causal organism has not become acclimated. Some writers speak of acclimatization of microorganisms as though it were the same as in the case of animals; however, it should be remembered that these minute forms of life multiply so rapidly that the adaptation must be applicable to descendants of those individuals which are able to reproduce under the new conditions of environment. One of the commonly occurring fungi (known as *Penicillum*) has been acclimated *(4)* to concentrations of copper, nickel, zinc, cadmium, and mercury compounds which are usually lethal for it. This fungus has been acclimated to grow in a concentration of nickel sulphate which was 10 times the usual lethal concentration. When it had been acclimated to copper, it also showed acclimatization to zinc and vice versa. Furthermore, acclimatization to both copper and zinc caused an increase in its resistance to nickel, cadmium, and mercury. However, acclimatization to nickel alone did not increase its resistance to cobalt. These experiments certainly indicated that the acclimatization of the *Penicillium* to one poisonous compound usually increased its resistance to closely related compounds.

It appears that a more resistant microflora in paper and board mills might develop in one of two ways. First, among the many species of microorganisms which were present during the initial period of satisfactory control, only a few of them might have been naturally more resistant to the disinfectant. Hence, during this initial period of control the less resistant and more numerous species would have been either killed or inhibited from growing. As time went on, the more resistant species would have become the predominant ones and, therefore, relatively numerous, which would explain the unsatisfactory bacteriological control. Second, a more resistant microflora might have developed by a gradual increase in resistance to the disinfectant by those microorganisms which possessed intially a very low resistance to the disinfectant. It may have been that some individual microorganisms possessed the ability to become acclimated, whereas others did not possess this ability. At any rate, the acclimatization of a part of the microflora would account for the failure to maintain satisfactory bacteriological control.

Acclimatization Studies

A series of experiments was initiated at The Institute of Paper Chemistry in February, 1942, for the purpose of determining the effect of sublethal concentrations of disinfectants upon a given species of bacteria. In other words, it was planned to obtain experimental evidence concerning the acclimatization of bacteria to disinfectants. *Aerobacter aerogenes* was selected as the test organism because it is so frequently encountered in slime. Sodium pentachlorophenate was selected as the first toxicant to be studied, since it is the toxic agent in several important commercial disinfectants such as Dowicide G, Nalco 21, and Santobrite. The last-named was used in this investigation.

It was deemed advisable to take into consideration the possibility of variation in initial resistance among individual cells of *A. aerogenes*. In order to learn something about this possibility, 11 single cell isolates of *A. aerogenes* were prepared from the parent culture. Each isolate was subcultured and maintained on standard nutrient agar. All of these were carefully checked for morphological and physiological characteristics. The 11 single cell isolates and the parent culture were typical cultures of *A. aerogenes*.

The first step in the acclimatization series was to determine the concentration of sodium pentachlorophenate which would completely inhibit growth of each isolate and the parent culture. A series of media containing standard nutrient agar and definite concentrations of Santobrite by weight (ranging from 0.01 to 0.07%) were used. The lowest concentration which completely inhibited growth in most cases was 0.03%; however, in one case, 0.02% was the lowest. These results can be interpreted as evidence to show that all isolates and the parent had approximately the same initial resistance.

Having determined this initial resistance, the next step was to attempt to increase it—i.e., to acclimate the cultures to grow on significantly higher concentrations of Santobrite. At first, each isolate and the parent were cultured on standard nutrient agar containing 0.01% of Santobrite by weight. After one week of growth on this medium, transfers were made to standard nutrient agar containing 0.02% of Santobrite by weight. Thus, each week a transfer was made to a concentration of Santobrite which differed from the preceding one by 0.005%.

The failures to grow occurred at various concentrations, starting with one isolate which grew on 0.04% but failed to grow on 0.05%. Table I gives the contrations of Santobrite which inhibited growth for the 11 isolates and the parent. In every case, some increase in resistance to Santobrite occurred. In the cases of Isolates 6 and 10, the maximum resistance was such that they grew on 0.23% but not on 0.235%. During 40 weeks these two isolates developed an amazing increase in resistance, since at first they were able to grow on 0.025% but not on 0.03%. In other words, the acclimatization was such that each grew on a concentration 9.2 times greater than it did initially. Similar calculations made for each of the other isolates and the parent show that some became only slightly acclimated—e.g., Isolate 4 and the parent, which were acclimated to grow on concentrations only 1.7 times as great as initially.

TABLE I.—CONCENTRATIONS OF SANTOBRITE IN MEDIA INHIBITING GROWTH AFTER MAXIMUM ACCLIMATIZATION

Culture	Concentration of Santobrite % by weight
Isolate 1	0.130
Isolate 2	0.165
Isolate 3	0.105
Isolate 4	0.050
Isolate 5	0.165
Isolate 6	0.235
Isolate 7	0.220
Isolate 8	0.125
Isolate 9	0.120
Isolate 10	0.235
Isolate 11	0.060
Parent	0.055

This range in ability to become acclimated may be attributed to inherent differences between the original single cells, which in turn transmitted this ability to their respective progenies. There were a few minor changes in the physiological characteristics of certain acclimated isolates. Much more significant, however, were changes in cell size as acclimatization

proceeded. Whereas the normal variation in cell size of *A. aerogenes* is 0.5 to 0.8 micron in diameter and 1 to 2 microns in length, extremely long cells of larger diameter than normally found were observed in many instances. In some cases, the cell length was 25 microns and the diameter was somewhat greater than that of normal cells. The two electron micrographs

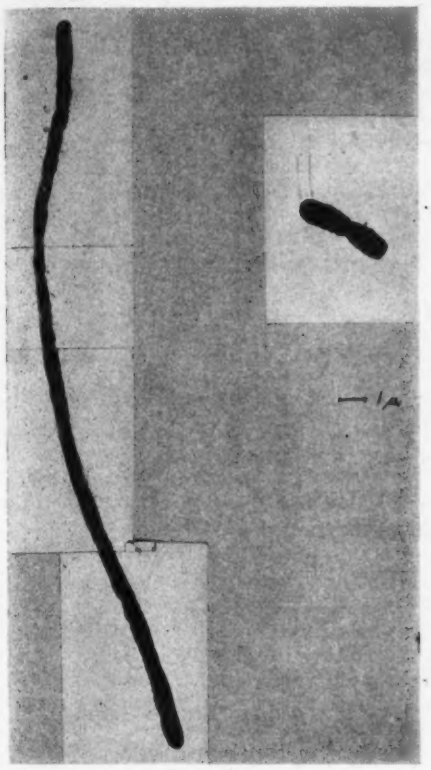

FIG. 1
Electromicrograph of Isolate 3

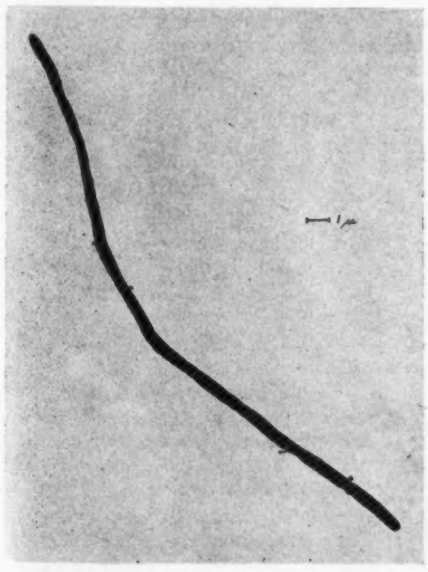

FIG. 2
Electromicrograph of Isolate 10 (Approx. 9000×)

FIG. 3
Photomicrograph of Isolate 5 (1000×)

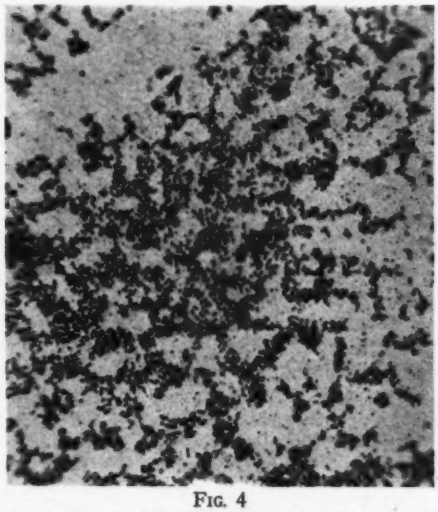

FIG. 4
Photomicrograph of Culture Acclimated to 0.125% of Santobrite (1000×)

illustrate this interesting result of acclimatization. Figure 1 was taken from Isolate 3 growing on 0.09% Santobrite. Two cells of normal size appear with one abnormally long cell. This isolate became acclimated to grow on 0.10% but did not grow on 0.105% (Table I). Figure 2 was taken from Isolate 10 after subculturing it for 15 weeks (weekly transfers) on 0.145%. This isolate was one of the two which became acclimated to grow on 0.230% but which failed to grow on 0.235% (Table I).

Permanence of Acclimatization

The permanence of this acclimatization has also been studied. During the various experiments in which isolates were subcultured on specific concentrations of Santobrite to which they had become acclimated, parallel cultures of these acclimated isolates were subcultured on standard nutrient agar (without any Santobrite). In every case observed, it was found that several weeks of successive transfers to standard nutrient agar caused the isolate to return to normal size and, more significant, to lose its acclimatization to the concentration on which it had been

growing. Figure 3 is a photomicrograph of Isolate 5 as it appeared upon becoming acclimated to 0.125% Santobrite. Figure 4 shows the appearance of a subculture (five weekly transfers) on standard nutrient agar made from the culture which had just become acclimated to 0.125%. The differences in cell size are very striking in these photomicrographs, which clearly indicate that loss in acclimatization and reduction in cell size accompany each other.

The relative toxicity of chemical disinfectants can be obtained by the flask method (*5*). The test organism used was *A. aerogenes* which, incidentally, was the parent culture employed in the present study. The flask method was used in the case of Isolate 7, after it had been acclimated to grow on 0.20% Santobrite to determine whether its resistance was really greater than that of Isolate 7 which had not been acclimated. The results appear in Table II and show clearly that the acclimated culture had a much higher resistance than the nonacclimated one.

TABLE II.—RELATIVE RESISTANCE OF THE SAME ISOLATE TO SODIUM PENTACHLOROPHENATE

Time Interval, min.	Concentration, % by Weight: 0.10		0.20		0.30		0.40	
	Growth							
	7x	7	7x	7	7x	7	7x	7
30	+	+	+	+	+	—	+	—
60	+	+	+	+	+	—	+	—
120	+	+	+	—	+	—	+	—
180	+	+	+	—	+	—	+	—
240	+	+	+	—	+	—	+	—
300	+	—	+	—	+	—	+	—

7 designates Isolate 7 which has never been on media containing sodium pentachlorophenate.
7x designates Isolate 7 after being acclimated to grow on the 0.20% concentration of sodium pentachlorophenate.

Although the maximum acclimatization indicated in Table I was that obtained for Isolates 6 and 10, it is probable that some of the isolates, which are still being grown continually on definite concentrations of Santobrite, will readily acclimate themselves to even higher concentrations than 0.23%. This phase of the study is being continued with a few isolates on seven different concentrations of Santobrite.

The evidence for acclimatization of *A. aerogenes* to Santobrite or, more specifically, to sodium pentachlorophenate, is completely convincing for a number of the isolates used in this study. This implies that some cases of unsatisfactory bacteriological control in paper and board mills may have resulted from acclimatization of certain bacteria to the disinfectant by long and continuous exposure to sublethal concentrations. After acclimatization has occurred, the disinfectant would become ineffective. It has been emphasized that the acclimatization of *A. aerogenes* to Santobrite is conditioned by continuous exposure to the sublethal concentrations, which implies that intermittent exposure may be a more effective way of using the disinfectant in the mill. It may be better to discontinue the dosage of the disinfectant completely for several weeks and then to resume its use. In the meantime, if necessary, a second disinfectant may be employed to advantage because preliminary studies at the Institute have shown that acclimatization to one disinfectant does not insure acclimatization to a completely different one.

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1. American Public Health Association. Standard methods for the examination of dairy products. 8th ed. New York, The Association, 1941. p. 138-141.
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3. Heilbrunn, Lewis V. An outline of general physiology. Philadelphia, Saunders, 1937. Chapter XXXIV.
4. Pulst, *Jahrb. wiss. Botanik* 37:205(1902) [quoted from (3)].
5. Appling, J. W., and Shema, B. F. Relative toxicity of materials recommended for slime control. *Paper Mill News* 65, no. 35:14, 16 (Aug. 29, 1942).

TAPPI Notes

The TAPPI Pacific Section will meet at Camas, Wash., October 5, 1943. Professors Bror L. Grondal of the School of Forestry, University of Washington, and Leo Friedman of the Dept. of Chemistry, Oregon State College, will talk on Recent Advances in Wood Technology.

The TAPPI Delaware Valley Section will meet jointly with the Penn.-N. J.-Del. Div. of the Superintendents Association at the Warwick Hotel, Philadelphia, Pa., on October 9, 1943. David Graham of the War Production Board and P. M. Loddengaard of Bulkley, Dunton & Company, will talk on papermaking fibrous raw materials.

The TAPPI Kalamazoo Valley Section will meet at the Columbia Hotel, Kalamazoo, Mich., on October 14, 1943.

The TAPPI New England Section will meet on Friday evening at the Kimball Hotel, Springfield, Mass., October 15, 1943. Werner Kaufman of Kupfer Bros., New York, N. Y., will report on the recent Chicago meeting of the Technical Association and W. S. Wilson of the Monsanto Chemical Company, Everett, Mass., will present a paper on Mersize. On Saturday, October 16, the Connecticut Valley Div. of the Superintendents Association will meet in the same place.

A golf tournament between the two local organizations will take place and in the evening there will be a dinner dance.

WPB Working to Aid Paper Supply

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., September 29, 1943—As part of its effort to minimize the impact of the paper shortage, the Printing and Publishing Division of the War Production Board is compiling comprehensive data on the current use of printing papers. A new form on which magazine publishers are required to report at once their use of paper in tons in 1942 and the first half of this year, is being mailed to all magazine publishers listed by the Bureau of the Census. Publishers are also requested to estimate the tonnage of paper they will have used in the third quarter of 1943, and what they expect to use in the last quarter of the year.

The types and weights of paper currently being used by each publisher are called for so that this information may be balanced against the supplies of such kinds and weights of paper available in the coming months.

The report form, which was developed by the Magazine and Periodical Section of the War Production Board in cooperation with the Bureau of the Census, has been condensed to cover only basically essential information which all publishers should be able to furnish readily from their own records or those of their printers.

Any magazine publisher who does not receive the form before September 30, is requested to write or wire at once to the Industry Division, Bureau of the Census, at Washington for his copy.

It is understood, in case the paper situation becomes more acute, that publishers who have filed the reports called for will be in a better position to receive consideration of their future proportionate paper requirements, than those who fail to send in the required data.

Joint Committee Announces Paper Awards

Names Successful Bidders To Furnish Government Printing Office With Various Grades and Quantities of Paper For Three Months' Period Beginning October 1, 1943 — Bids Were Opened Sept. 20.

WASHINGTON, D. C., Sept. 28, 1943—Awards were announced today by the Joint Congressional Committee for paper for the use of the Government Printing Office for a three months' period beginning October 1. Bids were opened on September 20. The awards were as follows:

No. 1, Marquette Paper Corp., 2.90 cents (600,000 pounds only).
No. 2, Cauthorne Paper Co., 5.25 cents.
No. 3, No bids.
No. 4, Barton, Duer & Koch Paper Co., 7.90 cents (500,000 pounds only).
No. 5, Barton, Duer & Koch Paper Co., 7.90 cents (500,000 pounds only).
No. 6, Marquette Paper Corp., 7.53 cents.
No. 7, Paper Corp. of U. S., 7.23 cents.
No. 8, Paper Corp. of U. S., 7.21 cents.
No. 9, Paper Corp. of U. S., 7.29 cents.
No. 10, Stanford Paper Co., 6.94 cents.
No. 18, Wilcox-Walter-Furlong Paper Co., 7.40 cents.
No. 19, Central Ohio Paper Co., 8.53 cents (150,000 pounds); Paper Corp. of U. S., 8.14 cents (500,000 pounds); Aetna Paper Co., 8.68 cents (200,000 pounds); Marquette Paper Corp., 8.95 cents (700,000 pounds).
No. 20, Paper Corp. of U. S., 7.61 cents.
No. 21, Paper Corp. of U. S., 7.46 cents (500,000 pounds); R. P. Andrews Paper Co., 7.49 cents (500,000 pounds); Aetna Paper Co., 7.56 cents (100,000 pounds); Whitaker Paper Co., 7.42 cents (400,000 pounds); Marquette Paper Corp., 7.80 cents (500,000 pounds).
No. 22, Paper Corp. of U. S., 7.09 cents.
No. 23, Paper Corp of U. S., 8.55 cents.
No. 24, Paper Corp. of U. S., 15.57 cents.
No. 26, Old Dominion Paper Co., 12.56 cents.
No. 27, Old Dominion Paper Co., 12.56 cents.
No. 29, Barton, Duer & Koch Paper Co., 15.75 cents.
No. 33, No bids.
No. 34, No bids.
No. 35, R. P. Andrews Paper Co., 7.09 cents (1,500,000 pounds).
No. 36, Mudge Paper Co., 6.84 cents.
No. 37, Barton, Duer & Koch Paper Co., 6.30 cents (480,000 pounds only).
No. 38, Barton, Duer & Koch Paper Co., 5.87 cents.
No. 41, Stanford Paper Co., 8.88 cents (200,000 pounds); John F. Post, Inc., 9.06 cents (250,000 pounds); Perkins-Goodwin Co., 9.15 cents (50,000 pounds).
No. 43, Old Dominion Paper Co., 12.87 cents.
No. 44, Bulkley, Dunton & Co., 5.75 cents (300,000 pounds); Old Dominion Paper Co., 5.3947 cents (1,000,000 pounds); Whitaker Paper Co., 5.57 cents (600,000 pounds).
No. 45, Whitaker Paper Co., 6.91 cents.
No. 46, Rejected.
No. 47, Aetna Paper Co., 9.48 cents.
No. 48, R. P. Andrews Paper Co., 12.83 cents (150,000 pounds); D. L. Ward Co., 12.74 cents (150,000 pounds).
No. 49, R. P. Andrews Paper Co., 12.50 cents (white); R. P. Andrews Paper Co., 13.00 cents (blue).
No. 50, Stanford Paper Co., 15.90 cents (1,000,000 pounds); Marquette Paper Corp., 6.40 cents (700,000 pounds).
No. 51, Bulkley, Dunton Co., 6.40 cents (500,000 pounds); Frank Parsons Paper Co., 6.40 cents (500,000 pounds); Old Dominion Paper Co., 6.40 cents (500,000 pounds); Berminghan & Prosser Co., 6.40 cents (300,000 pounds).
No. 52, Bermingham & Prosser Co., 6.65 cents.
No. 55, Barton, Duer & Koch Paper Co., 7.80 cents (1,000,000 pounds); Stanford Paper Co., 7.87 cents (600,000 pounds); Whitaker Paper Co., 7.69 cents (500,000 pounds).
No. 56, R. P. Andrews Paper Co., 7.19 cents (2,500,000 pounds); Cauthorne Paper Co., 7.29 cents (600,000 pounds).
No. 57, Perkins-Goodwin Co., 7.60 cents (500,000 pounds); Whitaker Paper Co., 6.95 cents (1,000,000 pounds).
No. 58, Central Ohio Paper Co., 6.65 cents (50,000 pounds); Perkins-Goodwin Co., 7.02 cents (500,000 pounds); Whitaker Paper Co., 6.90 cents (1,000,000 pounds).
No. 59, No bids.
No. 60, No bids.
No. 63, No bids.
No. 64, Aetna Paper Co., 15.48 cents (200,000 pounds).
No. 65, Stanford Paper Co., 15.50 cents (25,000 pounds); Virginia Paper Co., 15.20 cents (50,000 pounds).
No. 66, Paper Corp. of U. S., 17.32 cents (75,000 pounds); Barton, Duer & Koch Paper Co., 16.75 cents (75,000 pounds).
No. 67, Mudge Paper Co., 17.25 cents (No. 48, minimum order 10,000 pounds); Mudge Paper Co., 17.00 cents (No. 56, minimum order 10,000 pounds).
No. 68, Franklin Research Co., 18.50 cents (2,000,000 pounds); Barton, Duer & Koch Paper Co., 18.80 cents (200,000 pounds); Barton, Duer & Koch Paper Co., 21.00 cents (300,000 pounds); Stanford Paper Co., 21.00 cents (50,000 pounds).
No. 69, Barton, Duer & Koch Paper Co., 21.85 cents.
No. 71, Graham Paper Co., 9.22 cents.
No. 72, Bradner Smith & Co., 9.02 cents.
No. 73, Bradner Smith & Co., 10.05 cents.
No. 75, Marquette Paper Corp., 21.75 cents.
No. 76, Baxter Paper Co., 19.50 cents (50,000 pounds); Barton, Duer & Koch Paper Co., 19.00 cents (40,000 pounds); Stanford Paper Co., 18.80 cents (40,000 pounds); Old Dominion Paper Co., 18.494 cents (50,000 pounds); Old Dominion Paper Co., 18.993 cents (50,000 pounds); Stanford Paper Co., 19.30 cents (40,000 pounds).

No. 77, Paper Corp. of U. S., 18.47 cents.
No. 78, Barton, Duer & Koch Paper Co., 19.90 cents (40,000 pounds); Old Dominion Paper Co., 19.244 cents (50,000 pounds); Old Dominion Paper Co., 19.743 cents (50,000 pounds).
No. 84, Barton, Duer & Koch Paper Co., 27.35 cents.
No. 85, Barton, Duer & Koch Paper Co., 20.85 cents (100,000 pounds); Barton, Duer & Koch Paper Co., 21.85 cents (100,000 pounds).
No. 101, Eastern Corp., 11.46 cents (150,000 pounds); Cauthorne Paper Co., 9.00 cents (200,000 pounds).
No. 102, Eastern Corp., 9.31 cents (1,300,000 pounds); Cauthorne Paper Co., 7.87 cents (400,000 pounds).
No. 103, Aetna Paper Co., 11.33 cents.
No. 105, Aetna Paper Co., 15.72 cents.
No. 106, Whitehead & Alliger Co., 14.35 cents (100,000 pounds); Central Ohio Paper Co., 14.35 cents (50,000 pounds); Central Ohio Paper Co., 14.45 cents (50,000 pounds); Wilcox - Walter - Furlong Paper Co., 14.35 cents (100,000 pounds); R. P. Andrews Paper Co., 14.35 cents (50,000 pounds); Collins Mfg. Co., 13.50 cents (50,000 pounds); Collins Mfg. Co., 13.95 cents (50,000 pounds); Collins Mfg. Co., 14.25 cents (100,000 pounds); Barton, Duer & Koch Paper Co., 14.45 cents (250,000 pounds); Aetna Paper Co., 13.88 cents (500,000 pounds); Cauthorne Paper Co., 14.35 cents (100,000 pounds); Bradner Smith & Co., 14.69 cents (50,000 pounds); Whitaker Paper Co., 14.24 cents (500,000 pounds); Messinger Paper Co., 14.35 cents (250,000 pounds).
No. 107, Central Ohio Paper Co., 14.45 cents (100,000 pounds); Ris Paper Co., 14.35 cents (100,000 pounds); McIntosh Paper Co., 14.35 cents (100,000 pounds); Collins Mfg. Co., 13.49 cents (50,000 pounds); Collins Mfg. Co., 13.95 cents (50,000 pounds); Collins Mfg. Co., 14.25 cents (100,000 pounds); Aetna Paper Co., 13.88 cents (500,000 pounds); Whitaker Paper Co., 14.35 cents (50,000 pounds.
No. 108, Central Ohio Paper Co., 14.45 cents (100,000 pounds); Chicago Paper Co., 13.90 cents (100,000 pounds); Collins Mfg. Co., 13.49 cents (50,000 pounds); Collins Mfg. Co., 13.95 cents (50,000 pounds); Collins Mfg. Co., 14.25 cents 100,000 pounds); Aetna Paper Co., 13.88 cents (500,000 pounds).
No. 109, Aetna Paper Co., 15.98 cents.
No. 110, Collins Mfg. Co., 14.10 cents (50,000 pounds); Collins Mfg Co., 14.55 cents (50,000 pounds); Collins Mfg. Co., 14.85 cents (50,000 pounds); Aetna Paper Co., 14.13 cents (400,000 pounds).
No. 111, Collins Mfg. Co., 14.10 cents (50,000 pounds); Collins Mfg. Co., 14.55 cents (50,000 pounds); Collins Mfg. Co., 14.85 cents (100,000 pounds); Aetna Paper Co., 14.13 cents (400,000 pounds).
No. 120, R. P. Andrews Paper Co., 17.53 cents.
No. 121, R. P. Andrews Paper Co., 14.65 cents.
No. 122, R. P. Andrews Paper Co., 14.35 cents.
No. 123, Aetna Paper Co., 16.59 cents.
No. 125, R. P. Andrews Paper Co., 22.95 cents.
No. 126, R. P. Andrews Paper Co., 19.38 cents.
No. 128, Barton, Duer & Koch Paper Co., 22.90 cents.
No. 140, Old Dominion Paper Co., 25.84 cents.
No. 141, R. P. Andrews Paper Co., 26.42 cents.
No. 151, Aetna Paper Company, 8.24 cents (200,000 pounds).
No. 152, Rejected.
No. 153, Wilcox-Walter-Furlong Paper Co., 7.40 cents.
No. 154, Baxter Paper Co., 13.50 cents (100,000 pounds); Collins Mfg. Co., 13.52 cents (50,000 pounds); Collins Mfg. Co., 13.97 cents (50,000 pounds); Collins Mfg. Co., 14.10 cents (100,000 pounds); Aetna Paper Co., 13.49 cents (100,000 pounds; Tobey Fine Papers, Inc., 14.45 cents (100,000 pounds.
No. 155, Collins Mfg. Co., 13.52 cents (50,000 pounds); Collins Mfg. Co., 13.97 cents (50,000 pounds); Aetna Paper Co., 13.49 cents (100,000 pounds).
No. 156, R. P. Andrews Paper Co., 14.13 cents (100000 pounds); Collins Mfg. Co., 14.12 cents (50,000 pounds; Collins Mfg. Co., 14.57 cents (50,000 pounds); Collins Mfg. Co., 14.90 cents (100,000 pounds); Aetna Paper Co., 13.99 cents (200,000 pounds).
No. 160, Chicago Paper Co., 15.20 cents.
No. 161, Chicago Paper Co., 15.85 cents.
No. 168, Barton, Duer & Koch Paper Co., 19.00 cents.
No. 169, Barton, Duer & Koch Paper Co., 21.50 cents.
No. 176, Paper Corp. of U. S., 20.74 cents.
No. 177, Paper Corp. of U. S., 20.74 cents.
No. 183, Wilcox-Walter-Furlong Paper Co., 7.68 cents.
No. 184, Whitaker Paper Co., 7.67 cents (400,000 pounds).
No. 189, Barton, Duer & Koch Paper Co., 11.68 cents.
No. 190, Barton, Duer & Koch Paper Co., 11.68 cents (500,000 pounds); Barton, Duer & Koch Paper Co., 12.15 cents (500,000 pounds).
No. 191, Barton, Duer & Koch Paper Co., 13.25 cents.
No. 192, Barton, Duer & Koch Paper Co., 12.43 cents.
No. 195, Paper Corp. of U. S., 20.75 cents.
No. 196, Barton, Duer & Koch Paper Co., 20.30 cents.
No. 201, Stanford Paper Co., 9.89 cents.
No. 202, No bids.
No. 203, Whitaker Paper Co., 8.32 cents.
No. 205, Whitaker Paper Co., 12.23 cents
No. 208, Marquette Paper Co., 5.25 cents.
No. 209, Bulkley, Dunton & Co., 4.75 cents.
No. 210, Whitaker Paper Co., 5.875 cents (4¾" rolls); Whitaker Paper Co., 5.625 cents (7½" rolls).
No. 211, No bids.
No. 213, R. P. Andrews Paper Co., 17.75 cents; Perkins-Goodwin Co., 18.50 cents.
No. 217, R. P. Andrews Paper Co., 4.85 cents.
No. 218, R. P. Andrews Paper Co., 4.85 cents.
No. 219, R. P. Andrews Paper Co., 4.60 cents.
No. 220, No bids.
No. 221, No bids.
No. 222, No bids.
No. 252, No bids.
No. 254, R. P. Andrews Paper Co., 8.47 cents.
No. 255, R. P. Andrews Paper Co., 8.97 cents.
No. 265, Mudge Paper Co., 8.25 cents.
No. 271, No bids.
No. 276, Barton, Duer & Koch Paper Co., 8.50 cents.
No. 277, Barton, Duer & Koch Paper Co., 9.50 cents.
No. 280, Mudge Paper Co., 11.25 cents.
No. 281, Paper Corp. of U. S., 5.74 cents.

(Continued on page 110)

Henry Baldwin Heads Northwest Division

Northwest Division of American Pulp and Paper Mill Superintendents Association Holds One Day Annual Meeting at Wausau—Business Session A Constructive Feature — Other Industrial News.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., September 27, 1943—At a one-day annual meeting at Wausau, Wis., Saturday, September 18, the Northwest division of the American Pulp and Paper Mill Superintendents' Association elected as its chairman for the ensuing year Henry Baldwin of the Consolidated Water Power and Paper Company, Wisconsin Rapids, Wis. Mr. Baldwin served as first vice-chairman last year and succeeds John V. Zieman, mill manager of the Marinette Paper Company, Marinette, Wis.

Roy I. Nilsen of the North West Paper Company, Cloquet, Minn., was elected first vice-chairman, and Lester J. Smith of the Combined Locks Paper Company, Combined Locks, Wis., as second vice-chairman. A successor to Clarence Kronquist, secretary-treasurer, will be appointed by the chairman.

Business Sessions Held at Hotel Wausau

Business sessions were held at the Hotel Wausau, with approximately 100 in attendance. The principal speaker was Lyle M. Williams, associate priorities analyst of the War Production Board, attached to the Wausau office. He reviewed the regulations and procedures for granting priorities for maintenance and operating supplies for the mills.

Discussion topics included the relative merits of the various methods of pulp evaluation in the actual process of manufacture, and the application of pulp test control in the conversion of pulp to paper in order to attain a better quality from various blends of pulpwood.

Testimonial to Grover Keeth

The annual banquet was held at Hotel Wausau, and was largely a testimonial to Grover Keeth of the Marathon Paper Mills Company, Rothschild, Wis., who served as president of the American Paper and Pulp Mill Superintendents' Association this last year. The toastmaster was Fred C. Boyce of Wauwatosa, Wis., formerly of Wausau, the "daddy" of the Association, founded by him 25 years ago. Two others of the nine charter members, Fred Kranhold of the Kimberly-Clark Corporation, Neenah, Wis., and Richard M. Rawsch of the Appleton Machine Company, Appleton, Wis., were present. Mr. Kranhold and Roland Cunningham of the Northern Paper Mills, Green Bay, Wis., were presented with life memberships.

The Prize Winners

A luncheon was enjoyed at noon at the Wausau Country Club, followed by golf. The prize winners included F. W. Johnson of the Rhinelander Paper Company, Rhinelander, Wis., Walter Ayles of Wausau, and Lawrence W. Wendorf of the Marathon Paper Mills Company.

There were approximately 40 women guests who were tendered a luncheon and bridge party at the Wausau Club.

Serving on the arrangements committee were Harold Skinner, assistant superintendent of the Marathon Mills, George Urban, Grover Keeth and Roy Kelly, also of the Marathon mills, R. J. Tourangeau, superintendent of the Wausau Paper Mills Company, Brokaw, Wis., and Ernest Peterson, superintendent of the Mosinee Paper Mills Company, Mosinee, Wis. The golf tournament was in charge of Laurin S. Sabatke and Lawrence A. Pflieger. Mrs. Keeth and Mrs. Kelly served on the women's committee.

Neenah Co. Celebrates "E" Award

Elaborate ceremonies marked the awarding of the Army-Navy "E" banner to the Neenah Paper Company, Neenah, Wis., Saturday afternoon, September 25. The program was held in the finishing room, with officers, executives and employees present, each worker being permitted to bring one member of his family.

Leo E. Schubart, secretary-treasurer of the company, was master of ceremonies. The flag was formally presented by Major Robert B. Hamilton of the U. S. Army quartermaster corps, and it was accepted by D. K. Brown, president of the company. It was raised on the flagpole by members of the local company of the Wisconsin State Guard. The "E" pins to be worn by the workers were presented by Lieutenant-Commander T. H. Jones, U. S. Naval Reserve. Eight of the employees who had a combined record of 299 years service with the company accepted the pins for the workers.

The high school band of Neenah furnished music, and the program was broadcast over radio station WHBY.

Major Hamilton is assistant director of procurement at the army's depot at Jersey City, N. J. He was active in the paper industry for many years and is a member of the Technical Association of the Pulp and Paper Industry. He holds a key position in the procurement of pulp and paper, with the army's purchases of millions of pounds centralized at Jersey City. He delivered an address commending the Neenah Paper Company for its outstanding service in meeting the production qualifications which entitled it to this award, the first given to a rag content mill in the United States.

Other army officers present included: Brig. Gen. J. E. Barzinski, commanding officer of the Chicago quartermaster depot; Maj. C. E. Favinger, officer in charge of quartermaster inventory control; Major Edward A. McGinn, in charge of the subsistence section; Capt. Wilbur K. Bush, executive officer of the transportation division; Lieut. James B. Law, assistant public relations officer, Q.M.C., and Harvey J. Owens, consultant to the commanding general, Chicago quartermaster depot.

Lieutenant-Commander Jones has served the navy in both World Wars and was on the staff of the G. H. White Engineering Company, New York, when recalled to active duty. He was accompanied to Neenah by Lieut. J. R. Donaldson, Lieut. (J.G.) Edward Ryan, Jr., U.S.N., and Lieutenant-Commander James H. Kimberly, U. S. Coast Guard

Labor Problems Enter Newsprint Industry

Conference of American Federation of Labor Leaders In Montreal May Mean More Complications For Newsprint and Pulp Manufacturers—Paper Men Want Action On Pulpwood—Other Mill News.

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que, September 27, 1943—More complications for the newsprint and pulp-making industry are indicated by a conference in session here of the American Federation of Labor leaders representing large pulp and paper mills in Quebec and the Maritime Provinces. Subjects under discussion are understood to be wages, working conditions and general relations between management and employees. Among the companies and unions represented were: Price Brothers Mills, The Lake St. John Paper Company, Howard Smith Paper Mills, E. B. Eddy Company, Canadian International Paper Company, and the St. Lawrence Paper Mills Ltd.; the International Brotherhood of Papermakers, the International Brotherhood of Pulp, Sulphite and Paper Mill Makers, and other smaller locals of northern Quebec mills.

The meetings are being held in Canada. One subject understood to be under discussion at the early sessions was the growing influence of the National Catholic Syndicate, a French Canadian union which has been in conflict with the A. F. of L. at a number of mills over the question of jurisdiction. The conference went into recess on Friday night last and is to resume sittings on Wednesday (September 29) with a report from the union-employer committee.

Arthur Huggins, president of the International Brotherhood of Papermakers and chairman of the conference, on Friday refused to make any comment on the problems brought up for discussion. "I am not at liberty to disclose to you just what the union-employer committee is authorized to do, but the report next Wednesday will contain definite information," he said.

Labor Strike in Paper Mills

At the annual convention of the Confederation of Catholic Workers, just held in Granby, Que., a resolution was passed demanding that a special session of the Quebec Legislature be called immediately to legislate on recommendations of an inquiry commission, which investigated labor strife in St. John district paper mills, was made in a resolution passed at today's session of the annual convention of the Confederation des Travailleurs Catholiques du Canada (Confederation of Canadian Catholic Workers).

One recommendation of the commission, the taking of a jurisdictional vote, has already been carried out but the status of the claims of the C.T.C.C. unions and American Federation of Labor unions remains unsettled.

The disputes last spring, resulting in a two week strike, involved the Price Brothers plants at Jonquiere, Kenogami and River Bend and the Lake St. John Power and Paper Company at Dolbeau.

The vote, boycotted by the majority of A.F.L. members, resulted in large majorities for the C.T.C.C. unions. The A.F.L. executive asked their members to refrain from voting, claiming the ballot should not be taken until the termination of their existing contracts as sole bargaining agents for employees of the mills.

Advocating legislation restraining employers from making arbitrary distinction between workers by reason of their belonging "to one union or to another or none at all" the commission report made these recommendations:

Report Recommendations

1. That no collective agreement be made for a term of more than one year.
2. That no renewal or extension of an agreement be made except in the same manner as the original agreement and subject to the same essential condition.
3. That in every plant, governed by collective agreement, a grievance committee be set up to supervise the carrying out of the agreement on which the committee of the various workmen's associations, which took part in negotiating the agreement, would be represented.
4. That every collective agreement contain a compulsory arbitration clause for the settlement of any difficulties arising while the agreement is in force.

Paper Men Ask Action on Pulpwood

A delegation representing paper producing and consuming interests waited on the Federal government a day or two ago urging further classification and simplification of Selective Service regulations to the end that more men may be available for pulpwood cutting in the woods this winter.

The delegates told the government that farmers who normally go into the woods in the winter to cut pulpwood were refusing to do so because they feared their compulsory service deferment as farmers would be prejudiced.

The delegation was representative of the Canadian Daily Newspapers Association and the pulp and paper industry of Canada.

Government Will Meet Problem

After a 2½-hour conference with the cabinet, the delegates were told that the government was thoroughly aware of the problem and would do the best to meet it.

Resources Minister Crerar represented Prime Minister Mackenzie King, and was supported by Justice Minister St. Laurent, Labor Minister Mitchell, Finance Minister Ilsley, Defense Minister Ralston, Munitions Minister Howe and State Secretary McLarty.

The Canadian Daily Newspapers Association was represented by Wesley McCurdy, president of the association and vice-president and publisher of the Winnipeg Tribune; Senator Rupert Davies, president and publisher of the Kingston Whig-Standard and president of the Peterborough Examiner; Hon. Jacob Nicol, president and publisher of the Sherbrooke La Tribune, Three Rivers Le Nouvelliste, and head of the group which publishes Le Soleil and L'Evenement Journal in Quebec, and Ian Macdonald of Toronto, general manager of the association.

You Paper Mill Men • take a Tip on Kalamazoo Tile Stock Tanks and Chests • you can't beat them for STRENGTH and DURABILITY •

Kalamazoo Vitrified Glazed Tile
is a "Natural" for Paper Mill Needs—

Smooth, hard, strong, easily cleaned and highly resistant to chemical action, this marvelous vitrified glazed tile type of construction is preferred by scores of leading paper mill executives and engineers. Adaptable for stock tanks and chests of all kinds. Costs no more than concrete tanks that require constant maintenance expense.

An exclusive method of glazed tile tank construction developed by Kalamazoo engineers. It provides greater flexibility and lower cost for all paper mill stock handling problems. Immediately available.

● Any Size or Shape Desired—

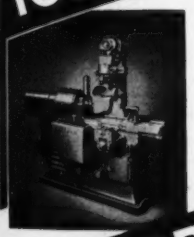
Wide, narrow—shallow or deep. Round, rectangular or square. Half-round or tapered bottom and corners. Midfeathers and fins where needed to control stock flow. Adaptable to pumps or agitators. Construction individually designed to meet space, tonnage or production requirements.

Ask for engineering data.

Kalamazoo TANK & SILO CO.
KALAMAZOO - MICHIGAN

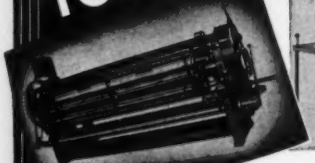
TODAY

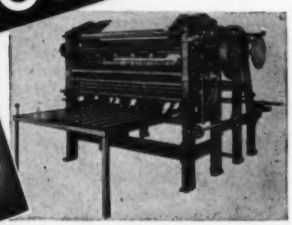
MACHINE TOOLS AND EQUIPMENT TO AID OUR FIGHTING FORCES



Our Engineering staff and plant facilities have been devoted to making tools—much of which is precision work of a high degree — and equipment that will aid our fighting forces.

TOMORROW





But, when the war is over, we will be better equipped than ever before to meet your requirements for paper converting machinery and parts. The above are two machines of our varied line that will then be available to you.

PAPER CONVERTING MACHINE CO.
GREEN BAY, WISCONSIN
Manufacturers of paper converting machinery for all purposes

PREVENTS ACCIDENTS!

Wahlert SAFETY CARBOY DRAINER

PREVENTS SPLASHING!

SAFEGUARDS EMPLOYEES!

The Wahlert carboy drainer is built on scientific lines, designed to prevent accidents caused by splashing and carelessness in pouring into smaller containers.

Uninterrupted flow of liquid is assured by the Air Vent which eliminates pumping or syphoning. This vent and the inverted spout are made of hard, acid-proof rubber which will stand considerable abuse and the cup is made of soft rubber which allows the drainer to be attached to carboys with slight differences in size of neck. All parts are replaceable.

SAFETY • Wahlert • PRODUCTS

MADE IN THREE SIZES
5 Gal. Size (1¼" to 2⅛")
Standard Size (2¾" to 3") 10 to 13 Gallon
Large Size (3¼" to 3½") Special Neck
These dimensions are outside diameter.
Send for Literature "P"

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INDUSTRIAL—SAFETY AND FIRE EQUIPMENT
25 LAFAYETTE ST., BROOKLYN, N. Y.

New York Paper and Pulp Market Review

Wholesale Demand For All Grades of Paper Continues Heavy—WPB Restricts Waxed Paper Output and Use—Pulpwood and Pulp Supply Situation Tight—Rag and Paper Stock Markets Are Active.

Wednesday, September 29, 1943.
Office of the PAPER TRADE JOURNAL.

Heavy demand continues to be reported in virtually all types of paper and paper products in the wholesale market, with most reports reflecting grave concern at the threatening short supply situation for the future.

The WPB imposed certain restrictions on waxed paper production and use, under General Conservation Order M-351. This order became effective on September 22. New specifications of type, weights and percentage of wax run from 10 to 80 pound paper, and from 10 to 80% of wax.

The index of general business activity for the week ended September 18 declined to 139.4, from 143.6 for the previous week, compared with 131.2 for the corresponding week last year. The index of paper board production was 144.5, compared with 147.0 for the previous week, and with 121.6 for the corresponding week last year.

Paper production for the week ended September 18 was estimated at 92.4%, compared with 85.2% for 1942, with 103.8% for 1941, with 85.0% for 1940, and with 93.4% for the corresponding week for 1939.

Paper board production for the week ended September 18 was 98.0%, compared with 81.0% for 1942, with 99.0% for 1941, with 74.0% for 1940, and with 80.0% for the corresponding week for 1939.

Recent orders and announcements issued by the WPB and other government agencies are indications of the increasingly serious outlook for an adequate supply of paper and paper products. The cut of 5% in newsprint consumption becomes effective on October 1. New restrictions on paper board folding and set-up boxes, for packaging cereals, candy and certain textile products are expected to save 21,000 tons of paper and paper board annually.

Wood Pulp

No material improvement has been reported in the serious pulpwood supply situation and while the campaign to cut more pulpwood this winter and the drive to collect more waste paper, should materially improve the all-over supply of paper and paper products, the situation still is about the same as last June. At that date receipts of pulpwood were 22% below 1942. Pulp production this year has been maintained by inventories, which are in some cases, now depleted. Paper board production is somewhat similarly affected, as board mills are drawing heavily upon inventories of paper stock. Reports indicate some board mills have been forced to operate on part-time and that inventories of paper stock in the New York area are, in some cases, averaging 26% of a normal two months' supply.

Rags

Current mill buying of new cotton cuttings is active, with most reports indicating the heaviest demand still exists in the colored grades. More limited supplies are also reported in colored cuttings, which are in a strong market position. All grades are firm at ceiling prices.

Demand is active for old cotton rags. The roofing grades are in very heavy demand, in part due, reports state, to the serious shortage and unfavorable prospect for an adequate supply of wood pulp.

Old Rope and Bagging

The market situation in many grades of old rope is tight. Prices are firm at ceilings.

Trading in scrap bagging is slow and volume is light. Prices continue nominal.

Old Waste Paper

The paper stock market is in a strong market position, as mill demand continues heavy and supplies are inadequate to fill current requirements. The campaign now on for increased collections of waste paper is reported in several quarters as helping to relieve the pressing scarcity, but labor for collection still remains an unsolved problem. Prices are strong at ceiling levels.

Twine

No important change in demand or prices has been reported in twine during the week. Mill buying of hard fibers continues active. No change from prevailing conditions are expected in the trade, and civilian use is becoming more and more dependent upon cotton and paper twines.

ANNOUNCE PAPER AWARDS

(Continued from page 106)

No. 302, Old Dominion Paper Co., $33.868 per M sheets.
No. 303, Old Dominion Paper Co., $48.728 per M sheets.
No. 304, Old Dominion Paper Co., $71.578 per M sheets.
No. 305, Old Dominion Paper Co., $42.409 per M sheets.
No. 306, Frank Parsons Paper Co., 5.50 cents.
No. 307, No bids.
No. 308, No bids.
No. 325, R. P. Andrews Paper Co., 5.97 cents (500,000 pounds); Whitaker Paper Co., 5.91 cents (1,000,000 pounds).
No. 326, R. P. Andrews Paper Co., 5.97 cents (500,000 pounds); Whitaker Paper Co., 6.01 cents (300,000 pounds).
No. 327, R. P. Andrews Paper Co., 5.97 cents (800,000 pounds); Whitaker Paper Co., 6.09 cents (700,000 pounds).
No. 351, R. P. Andrews Paper Co., $7.15 per C sheets.
No. 352, Barton, Duer & Koch Paper Co., $18.85 per C sheets.
No. 360, Whitaker Paper Co., 2.6638 cents.
No. 366, Mathers-Lamm Paper Co., 4.085 cents (440,000 pounds).
No. 367, No bids.
No. 368, Consolidated Paper Co., 5.40 cents (car lots); Consolidated Paper Co., 5.87 cents (less than car loads).

JOHNSON JOINTS

The Trouble-Free, Dollar-Saving Way to *KEEP ROLLS ROLLING*

NOT just in a figurative sense—but in a practical, money-saving, production-boosting way—the Johnson Rotary Pressure Joint *Keeps 'Em Rolling* in the paper industry.

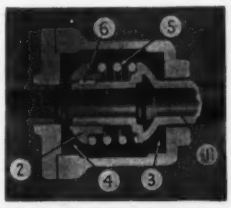
It keeps rolls rolling because it keeps them free from all the troubles of the old stuffing box steam fits. No more packing, or repacking. No more oiling. No more adjusting. No more life-shortening wear or loss of efficiency from misalignment. No more time wasted while machines are shut down to service or replace steam fits. No more worry about syphon drainage pipes rubbing on dryer journals.

Down goes maintenance; up goes production. No wonder so many paper mills have been quick to adopt the Johnson Joint way to Keep 'Em Rolling. Over one hundred mills have purchased 50 or more Johnson Joints; over fifty mills have purchased from 100 to as many as 800.

Write for catalog

Sizes for all Paper Machines, Calenders, and Corrugators

Nipple (1) fastened to roll. Sliding collar (2), keyed (6) to nipple. Carbon graphite seal ring (3) and bearing ring (4), which eliminate packing and oiling. Spring (5) is for initial seating only; in operation joint is pressure-sealed.



MAKES COMPRESSED AIR COME CLEAN

The Johnson-Gast Separator removes more than 99% of all water, dirt, and oil from compressed air—prevents rusting of pneumatic machinery and rapid deterioration of air hose. Also available for service on steam lines. Team mate is the Johnson-Gast Aftercooler, which circulates cooling water around compressed air line to condense all vaporized moisture—so Separator can remove it. Write for bulletin.

The Johnson Corporation

828 WOOD STREET · THREE RIVERS, MICHIGAN

WIDEN YOUR SILICATE GRADE, RANGE

If silicate of soda is just "water-glass" to you, ask for a copy of PQ Bulletin #17-1. In it are described over 30 different silicates from $3Na_2O_2 \cdot 2SiO_2$ to $Na_2O \cdot 3.9SiO_2$ (dry and solutions).

Why so many grades? Because the properties of the various silicates are different and therefore fit many diversified uses as adhesives, binders, deflocculants, inhibitors, detergents, colloids. In the paper industry, some popular uses are:

RAG COOKING . . . . . Metso Granular
BLEACHING PAPER PULPS . . . . . "B-W"
LINING DIGESTERS . . . . . "U" Brand
PAPER SIZING . . . . . A-Syrup
CASEIN SOLVENT . . . . . "O" Brand
GREASEPROOFING PAPER . "N", "S" Brand
DE-INKING PAPER . . . . . Metso Granular
TUBING . . . . . "O" Brand

For information on using Silicates, turn to PQ. Specific advices where particular conditions are known.

SILICATES OF SODA

PHILADELPHIA QUARTZ CO.

Gen'l Off.: 125 S. Third St., Phila., Pa.
Chicago Sales Off.: 205 W. Wacker Dr.
9 Mfg. Plants · Distributors in 60 cities

MISCELLANEOUS MARKETS

Office of the PAPER TRADE JOURNAL.
Wednesday, September 29, 1943.

BLANC FIXE—Current reports indicate no change in the market for blanc fixe. Prices are firm. The current quotation is $40 per ton for the pulp, in barrels, at works. The powder is quoted at $60 per ton, f.o.b., works.

BLEACHING POWDER—Demand is good for bleaching powder. Prices continue unchanged. Current quotations range from $2.50 to $3.10 per 100 pounds, in drums, car lots, at works.

CASEIN—OPA maximum prices on processed acid-precipitated casein are as follows; 10,000 pounds or more, 24 cents per pound; 2,000 pounds, 24¼ cents per pound; less than 2,000 pounds, 24¾ cents per pound, f.o.b., shipping point.

CAUSTIC SODA—The supply situation in caustic soda is still reported tight. Quotations are firm and unchanged. The current quotation on solid caustic soda is $2.30 per 100 pounds; flake and ground are quoted at $2.70 per 100 pounds, in drums, at works.

CHINA CLAY—The market for china clay is reported moderate for some grades. Quotations continue unchanged. Domestic filler clay is quoted at from $7.50 to $15 per ton; coating clay at from $12 to $22 per ton, at mines. Imported china clay is quoted at from $13 to $25 per long ton, ship side.

CHLORINE—No important change in the supply situation reported this week. Quotations are unchanged. Chlorine is currently quoted at $1.75 per 100 pounds, in single-unit tank cars, f.o.b., works.

ROSIN—Quotations on some grades of rosin are higher this week. "G" gum rosin is currently quoted at $3.95 per 100 pounds, in barrels, Savannah. "FF" wood rosin is currently quoted at $3.91 per 100 pounds, in barrels, New York. Seventy per cent gum rosin size is quoted at $4.14 per 100 pounds, f.o.b., works.

SALT CAKE—Current quotations on salt cake continue unchanged. Demand continues moderate. Domestic salt cake is currently quoted at $15 per ton, in bulk; chrome cake is quoted at $16 per ton. All prices in car lots, f.o.b. shipping point.

SODA ASH—The market situation of soda ash remains unchanged. Quotations are firm and conform to prevailing prices. Prices on soda ash in car lots, per 100 pounds, are as follows: in bulk, $.90; in paper bags, $1.05; and in barrels, $1.35.

STARCH—No improvement in the tight supply situation of corn and its products is reported at this date. Prices are unchanged. Pearl is currently quoted at $3.10 per 100 pounds; powdered starch at $3.20 per 100 pounds; all prices in bags, car lots, f.o.b. Chicago.

SULPHATE OF ALUMINA—All applications for WPB allocations on sulphate of alumina are reported granted for the current period. The commercial grades are quoted at from $1.15 to $1.25 per 100 pounds; iron free is quoted at $2.35 per 100 pounds. All prices in bags, car lots, f.o.b., works.

SULPHUR—The sulphur market continues unchanged under a good, steady demand. Annual contracts are currently quoted at $16 per long ton, f.o.b. mines.

The current contract quotation at Gulf Ports is $17.50 per long ton.

TALC—Quotations on talc are unchanged and continue to conform to prevailing prices. Domestic talc is currently quoted at from $16 to $21 per ton, at mines.

MARKET QUOTATIONS

All market quotations, excepting those otherwise designated as official OPA maximum prices, are based on the manufacturers' price level as of October 1-15, 1941; maximum wholesale prices are based on the merchants' maximum prices for stipulated quantities at a quoted price to all customers of a like class, as shown by the merchant's sales records of goods delivered during March, 1942. A merchant's price list in effect in March 1942, showing quotations of actual shipments, will establish the current maximum prices.

Paper

(Delivered New York)

News, per ton—

Roll, contract...	*$58.00	@	—
Sheets	64.00	"	—

* OPA Maximum Price.

Kraft—per cwt.—Car load Quantities Zone A, f.o.b. Mill

Superstandard Wrapping	*$5.25	@	—
No. 1 Wrapping...	*5.00	"	—
Standard Wrapping	*4.75	"	—
Standard Bag.....	*4.375	"	—

* OPA Manufacturers' Prices.

Tissues—Per Ream—Carlots

White No. 1.....	1.12½	"	—
White No. 1 M. G.	1.10	"	—
White No. 1½....	1.00	"	—
White No. 2.....	.90	"	—
Anti-Tarnish M.F..	1.20	"	—
Colored	—	"	—
Kraft	.95	"	—
Manila	.90	"	—

Toilet—1 M. Sheets—Per Case

Unbleached	4.25	"	—
Bleached	5.70	"	—
Unbl. Toilet, 1 M.	4.16	"	—
Bleached Toilet...	5.70	"	—

Paper Towels, Per Case—

Unbleached, Jr.....	2.60	"	—
Bleached, Jr.....	3.20	"	—

Manila—per cwt.—C. l. f. a.

No. 1 Jute.....11.25		@	—
No. 1 Manila Wrapping, 35 lb.....	6.00	"	6.25
No. 2 Manila Wrapping, 35 lb.....	5.75	"	6.00

Boards, per ton—

News	*48.00	@	—
Chip	*45.00	"	—
Sgl. Mla. Lt. Chip	*60.00	"	—
White Pat. Coated	*75.00	"	—
Kraft Liners 50 lb.	*63.00	"	—
Binders Boards....84.00		"	116.00

* OPA Base Prices per 10 tons. Less than 10 tons but over 3 tons, add $2.50; three tons or less, add $5; regular 35-39 basis, add $5.; basis 40-49, add $2.50; basis 91-100, add $2.50; basis 101-120, add $5.

The following are representative of distributors' resale prices:

Rag Content Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds	Ledgers
100% Rag Ext. No. 1	$39.10@$46.00	$40.25@$47.25
100% Rag	32.20 " 37.75	33.35 " 39.25
85% Rag	.... "	29.90 " 35.00
75% Rag	23.00 " 27.00	24.15 " 28.25
65% Rag	.... "	22.80 " 27.75
50% Rag	18.70 " 22.75	19.90 " 24.25
25% Rag	16.40 " 20.00	17.55 " 21.50

Colors at $1.00 cwt. extra.

Sulphite Bonds and Ledgers—White, Assorted Items. Delivered in Zone 1:

	Bonds	Ledgers
No. 1..	$10.55@$12.75	$11.70@$14.25
No. 2..	9.65 " 11.75	10.80 " 13.25
No. 3..	9.20 " 11.25	10.35 " 12.50
No. 4..	8.90 " 10.75	10.05 " 12.25

Colors $1.00 cwt. extra.

Free Sheet Book Papers—White, Cased Paper, Delivered in Zone 1:

No. 1 Glossy Coated...	$13.65	@	$13.30
No. 2 Glossy Coated...	12.40	"	14.00
No. 3 Glossy Coated...	11.60	"	13.25
No. 4 Glossy Coated...	11.15	"	12.75
No. 1 Antique (watermarked)	10.25	"	11.75
No. 2 Offset.....	9.60	"	11.00
A Grade E. F.....	9.35	"	10.75
A Grade S. & S. C....	9.60	"	11.00
B Grade E. F.....	8.85	"	10.25
B Grade S. & S. C....	9.10	"	10.50
C Grade E. F.....	8.55	"	9.75
C Grade S. & S. C....	8.80	"	10.00
D Grade E. F.....	8.25	"	9.50
D Grade S. & S. C....	8.50	"	9.75

Ivory & India at $.50 cwt. extra.

Wood Pulp

OPA Maximum Prices and Canadian Manufacturers Prices, Less Freight, Not Exceeding OPA Allowances.

Bl. Softwood Sulphite.....	$74.00
Unbl. Softwood Sulphite.	65.00@ 66.00
Bl. Hardwood Sulphite.....	73.50
Unbl. Hardwood Sulphite....	63.50
Bl. Mitscherlich.....	81.00
Unbl. Mitscherlich ...	72.00 @ 82.00
N. Bleached Sulphate.....	86.00
S. Bleached Sulphate.....	79.00
N. Semi-Bleached Sulphate...	82.00
S. Semi-Bleached Sulphate....	75.00
N. Unbl. Sulphate.....	73.00
S. Unbl. Sulphate.....	63.50
Bl. Soda	66.00
Unbl. Soda	62.00
Groundwood	46.00

Transportation Allowances Applying to Producers of Wet Wood Pulp.

	Below 50% Air Dry Weight
Northeast	$13.50
Lake Central	13.50
Southern	16.00
West Coast (in area).....	10.50
West Coast (out area).....	16.50

	50%-80% Air Dry Weight
Northeast	$11.50
Lake Central	11.50
Southern	14.00
West Coast (in area).....	9.50
West Coast (out area).....	15.50

Applying to Producers of Dry Wood Pulp.

	Above 80% Air Dry Weight
Northeast	$8.50
Lake Central	8.50
Southern	11.00
West Coast (in area).....	7.50
West Coast (out area).....	13.50

Should freight charges actually exceed these allowances, the difference may be added to the maximum prices.

Domestic Rags

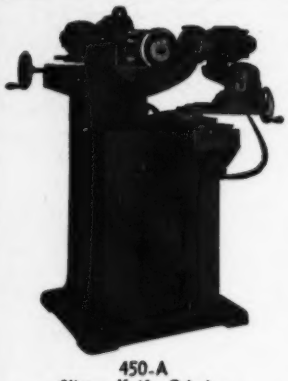
New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1..	6.50	@	7.25*
Silesias No. 1.....	—	"	5.75*
New Unbleached...	6.75	"	7.50*
Blue Overall.....	—	"	5.50*
Fancy	—	"	3.50*
Washables	—	"	3.00*
Bleached Khaki Cuttings	—	"	4.25*
Unbleached Khaki Cuttings	—	"	3.50*

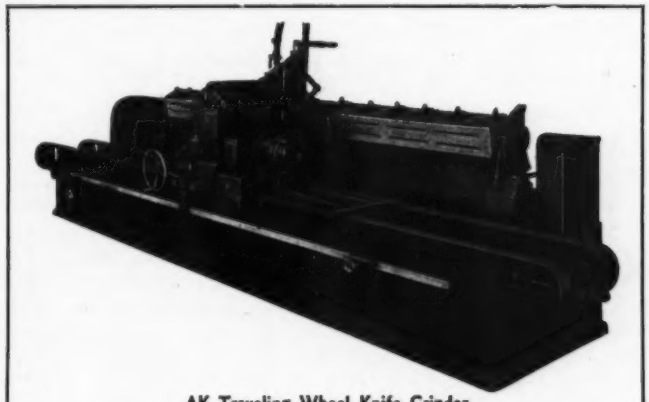
* OPA Maximum Prices.

PRECISION KNIFE GRINDING



450-A
Slitter Knife Grinder

Especially adapted for knives with a long thin taper, the Covel-Hanchett 450-A Grinder can be set up for a great variety of knives. Timken Roller Bearings for grinding wheel spindle, solid cabinet base, wet grinding equipment. For work 2" to 20" diameter, any thickness, any bevel. Write for bulletin 123-11 for details.

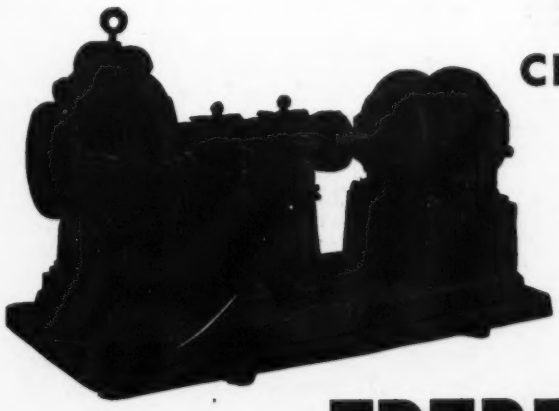


AK Traveling Wheel Knife Grinder

Here is a powerful, precise machine for accurate high production grinding of your long knives, short knives in multiples, planer, doctor, hog, paper, shear, veneer . . . almost any blades. And with real economy in heavy stock removal requirements to extremely accurate light cuts. Belt-covered ways, force feed lubrication, preloaded precision bearings, smooth, positive transmission. You should have the details in our bulletin 178-11. Write today.

COVEL-HANCHETT CO., Big Rapids, Mich., U. S. A.

→ → → **CONTINUOUS PUMPING OF HIGH CONSISTENCY STOCKS WITHOUT CLOGGING, WITHOUT SHUT DOWNS**



Your **FREDERICK** pump handles high density stock with the greatest of ease, meets your operating needs perfectly . . . because **FREDERICK** pumps are engineered specifically for each job. And, your **FREDERICK** pump is guaranteed to meet the operating conditions for which it is sold.

FREDERICK PUMPS

ASK ABOUT IT . . .
NO OBLIGATION
WHATSOEVER

The FREDERICK IRON & STEEL CO.
Frederick, Maryland

Old Rags

White, No. 1—			
Repacked	*3.80	"	—
Miscellaneous	*3.20	"	—
White, No. 2—			
Repacked	*2.90	"	—
Miscellaneous	*2.65	"	—
Third and Blues—			
Repacked	*2.20	"	—
Miscellaneous	*1.80	"	—
Roofing Rags—			
No. 1	*1.55	"	—
No. 2	*1.45	"	—
No. 3 (bagging)	*1.35	"	—
No. 4	*1.35	"	—
No. 5A	*1.35	"	—
Old Manila Rope	5.75	"	—

OPA Maximum Prices.

Foreign Rags

All Prices nominal

New Rags

New Dark Cuttings	2.25	@	2.40
New Mixed Cuttings	2.00	"	2.20
New Light Silesias	5.50	"	5.75
Light Flannelettes	5.50	"	5.75
New White Cuttings	7.00	"	7.50
New Light Oxfords	4.00	"	4.50
New Light Prints	3.00	"	3.25

Old Rags

No. 1 White Linens	7.50	"	8.50
No. 2 White Linens	6.50	"	7.50
No. 3 White Linens	4.50	"	—
No. 4 White Linens	2.25	"	3.25
No. 1 White Cotton	4.25	"	4.75
No. 2 White Cotton	3.25	"	3.75
No. 3 White Cotton	2.50	"	3.00
No. 4 White Cotton	1.90	"	2.20
Extra Light Prints	2.00	"	2.40
Ord. Light Prints	1.75	"	2.15
Med. Light Prints	1.55	"	1.95
Dutch Blue Cottons	2.25	"	2.50
French Blue Linens	3.00	"	—
Checks and Blues	2.00	"	—
Linsey Garments	1.90	"	2.00
Dark Cottons	1.50	"	1.60
Old Shopperies	1.30	"	1.45
New Shopperies	1.45	"	1.50
French Blues	2.25	"	2.50

BAGGING

(Prices to Mill, f. o. b. N. Y.)

Gunny No. 1—			
Foreign	Nominal		
Domestic	4.25	@	4.35
Wool Tares, light	4.25	"	4.50
Wool Tares heavy	4.50	"	5.00
Bright Bagging	4.50	"	4.85
Manila Rope—			
Foreign	—	"	—
Domestic	*5.75	"	—
Jute Threads	5.50	"	—
No. 1 Sisal Strings	*4.00	"	—
Mixed Strings	2.00	"	—

* OPA Maximum Price.

Old Waste Papers

(F. o. b. New York)

OPA Maximum Prices

No. 1 Hard White Envelope Cuts, one cut	3.37½	@	—
No. 1 Hard White Envelope Cuts	3.12½	"	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
No. 1 Hard White Shavings, ruled	2.50	"	—
Soft White Shavings, one cut	2.87½	"	—
No. 1 Soft White Shavings	2.50	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Mixed Groundwood Fly Leaf Shavings	.90	"	—
Mixed Colored Shavings	.75	"	—
Mixed Groundwood Colored Shavings	.90	"	—
Overissue Magazines	1.67½	"	—
No. 1 Heavy Books & Magazines	1.67½	"	—
Mixed Books	.85	"	—
No. 1 White Ledger	2.17½	"	—
No. 2 Mixed Ledger, colored	1.87½	"	—
New Manila Envelope Cuttings, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
Extra Manilas	1.85	"	—
Mixed Kraft, Env. & Bag Cuttings	2.75	"	—
Kraft Envelope Cuttings	3.25	"	—
Triple Sorted, No. 1 Brown Soft Kraft	2.50	"	—
New 100% Kraft Corrugated Cuttings	2.25	"	—
No. 1 Assorted Old Kraft	1.75	"	—
New Jute Corrugated Cuttings	.90	"	—
Old 100% Kraft Corrugated Containers	1.75	"	—
Old Corrugated Containers	1.15	"	—
Box Board Cuttings	.72½	"	—
White Blank News	1.65	"	—
Overissue News	.85	"	—
No. 1 News	.75	"	—
No. 1 Mixed Paper	.70	"	—
Old Corrugated Containers	.82½	"	—
Mill Wrappers	.85	"	—

Twines

(F. o. b. Mill)

(Soft Fiber)

Coarse Polished—			
India	.21	@	—
White Hemp	.21	"	—
Fine Polished—			
Fine India	.26	"	—
Unpolished—			
Box	.17¼	"	—
Paper Makers	.17	"	—
Tube Rope	.19	"	—
Wall Paper	.20½	"	—
Wrapping	.23	"	—
Soft Fiber Rope	.19	"	—
Cotton	.25	"	—

(Hard Fiber)

Medium Java	.18	"	—
Mex. Sisal	.16	"	—
Manila		"	—

PHILADELPHIA

Domestic Rags (New)

(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—			
New White No. 1	.07¼	@	.07½
New White No. 2	.04½	"	.05
Light Silesias	.04½	"	.04¾
Silesias, No. 1	.04	"	.04¼
Black Silesias, soft	.03¾	"	.04
New Unbleached	.07¼	"	.07½
Washable Prints	.03¼	"	.03½
Washable No. 1	.02	"	.02¼
Blue Overall	.04½	"	.05½
Cottons—According to grades—			
Washable shredding	—	"	.01¾
Fancy Percales	.03¼	"	.03½
New Black Soft	.02¾	"	.03
New Dark Seconds	1.75	"	2.00
Khaki Cuttings—			
No. 1 O. D.	.03	"	.03½
No. 2 Mixed	.02½	"	.02½
Corduroy	.01¾	"	.02¾
New Canvas	.04¾	"	.05¼
New Black Mixed	—	"	.02½

Domestic Rags (Old)

White No. 1—Repacked	3.80	"	—
White No. 2—Repacked	2.90	"	—
Miscellaneous No. 1	3.20	"	—
Miscellaneous No. 2	2.65	"	—
Thirds and Blues—			
Miscellaneous	1.80	"	—
Repacked	2.20	"	—
Black Stockings—			
(Export)	Nominal		
Roofing Stock—			
Foreign No. 1	Nominal		
Domestic No. 1	1.55	"	—
Domestic No. 2	1.45	"	—
Roofing Bagging	1.35	"	—
Old Manila Rope	5.75	"	—

Bagging

(F. o. b. Phila.)

Gunny No. 1—			
Foreign	Nominal		
Domestic	3.00	"	3.50
Sisal Rope	3.75	"	—
Mixed	1.00	"	1.50
Scrap—			
No. 1	3.25	"	3.50
No. 2	1.75	"	1.80
Wool Tares, heavy	4.00	"	4.25
No. 1 New Light Burlap	3.00	"	4.00
New Burlap Cuttings	3.75	"	4.00

Old Papers

(F. o. b. Phila)

OPA Maximum Prices

No. 1 Hard White Envelope Cuts, one cut	3.37½	"	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
Soft White Shavings, one cut	2.50	"	—
White Blank News	1.65	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 White Ledger	2.17½	"	—
No. 2 Ledger, colored	1.87½	"	—
No. 1 Heavy Books & Magazines	1.67½	"	—
Overissue Magazines	1.67½	"	—
New Manila Envelope Cuttings	2.65	"	—
No. 1 Assorted Old Kraft	1.75	"	—
No. 1 Mixed Paper	.70	"	—
Box Board Cuttings	.72½	"	—
Ksaft Corrugated Cuttings	2.25	"	—
Old Corrugated Containers	1.15	"	—
Overissue News	.85	"	—
No. 1 News	1.00	"	—

BOSTON

Old Papers

(F. o. b. Boston)

OPA Maximum Prices

No. 1 Hard White Shavings, unruled	2.87½	@	—
No. 1 Hard White Shavings, ruled	2.50	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Groundwood Fly Leaf Shavings	.90	"	—
Mixed Colored Shavings	.75	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
Hard White Envelope Cuts, one cut	3.37½	"	—
Triple Sorted No. 1 Brown Soft Kraft	2.50	"	—
Mixed Kraft Env. & Bag Cuttings	2.75	"	—
Kraft Envelope Cuttings	3.25	"	—
No. 1 Heavy Books & Magazines	1.67½	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
White Blank News	1.65	"	—
No. 1 Assorted Old Kraft	1.75	"	—
No. 1 Mixed Paper	.70	"	—
Overissue News	.85	"	—
Box Board Cuttings	.72½	"	—
New Corrugated Cuttings, Kraft	2.25	"	—
Old 100% Kraft Corrugated Containers	1.75	"	—
Old Corrugated Containers	1.15	"	—
Jute Corrugated Cuttings	1.07½	"	—

Bagging

(F. o. b. Boston)

Gunny Bagging—			
Foreign	(nominal)		
Domestic	—	"	3.50
Sisal Rope No. 1	*4.75	"	—
Sisal Rope No. 2	*4.25	"	—
Mixed Rope	1.35	"	1.50
Transmission Rope—			
Foreign	(nominal)		
Domestic	2.75	"	3.00
Manila Rope—			
Foreign	(nominal)		
Domestic	5.75	"	—
Soft Jute Rope	4.50	"	5.00
Jute Carpet Threads	3.00	"	3.50
Bleachery Burlap	8.50	"	9.00
Scrap Burlap—			
Foreign	(nominal)		
Domestic	—	"	3.50
Wool Tares—			
Foreign	(nominal)		

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	.04½	@	.04¾
Fancy Percales	.04¾	"	.05
New White No 1.	.06¾	"	.07
New Light Flannelettes	.05½	"	.06
Canton Flannels, Bleached	.06	"	.06¼
Underwear Cutters, Bleached	.06¼	"	.06¾
Underwear Cutters, Unbleached	.05¾	"	.06
Silesias No. 1	.06	"	.06¼
New Black Silesias	.03	"	.03½
Red Cotton Cuttings	.03½	"	.04
Soft Unbleached	.06½	"	.06¾
Blue Cheviots	.05½	"	.06
Fancy	.02¾	"	—
Washable	.02¾	"	—
Khaki Cuttings	.02¾	"	.03
O. D. Khaki	.03½	"	.03¾
Corduroy	.03¼	"	.03½
New Canvas	.06¼	"	.06¾
B. V. D. Cuttings	.06¼	"	.06¾
Domestic	4.25	"	—
Aust. Wool Pouches	4.65	"	4.87½
New Burlap Cuttings	4.75	"	5.00
Heavy Baling Bagging	4.00	"	4.25
Paper Mill Bagging	2.50	"	3.00
No. 2 Bagging	1.35	"	—*

* OPA Maximum Price.

Domestic Rags (Old)

(F. o. b. Boston)

White No. 1—			
Repacked	3.80	@	—*
Miscellaneous	3.20	"	—*
White No. 2—			
Miscellaneous	2.65	"	—*
Twos and Blues, Repacked	2.20	"	—*
Old Blue Overalls	2.25	"	2.50
Thirds and Blues, Repacked	2.20	"	—*
Miscellaneous	1.80	"	—*
Black Stockings	3.50	"	4.00
Roofing Stock—			
No. 1	1.55	"	—*
No. 2	1.45	"	—*
No. 3	1.35	"	—*
No. 4	1.35	"	—*
No. 5, Quality A	1.35	"	—*
Quality B	1.20	"	—*
Quality C	.95	"	—*
Old Manila Rope	5.75	"	—

* OPA Maximum Prices.

Foreign Rags

(F. o. b Boston)

Canvas	(nominal)
Dark Cottons	(nominal)
Dutch Blues	(nominal)
New Checks and Blues	(nominal)
Old Fustians	(nominal)
Old Linsey Garments	(nominal)
New Silesias	(nominal)

CHICAGO

Waste Paper

(F. o. b. Chicago)

OPA Maximum Prices.

Shavings—			
No. 1 Hard White Envelope Cuts, one cut	3.37½	"	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
No. 1 Soft White Shavings	2.50	"	—
No. 1 White Ledger	2.17½	"	—
No. 1 Heavy Books & Magazines	1.67½	"	—
White Blank News	1.65	"	—
Mixed Kraft Env. & Bag Cuttings	2.75	"	—
No. 1 Assorted Old Kraft	1.75	"	—
Overissue News	.85	"	—
No. 1 News	.75	"	—
No. 1 Mixed Paper	.70	"	—
No. 1 Roofing Rags	1.55	"	—
No. 1 Roofing Bags	1.45	"	—